The Canadian Medical Association Journal

With which is incorporated the MONTREAL MEDICAL JOURNAL and the MARITIME MEDICAL NEWS

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AND ITS AFFILIATED PROVINCIAL MEDICAL ASSOCIATIONS

PUBLISHED MONTHLY BY

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The Canadian
Medical Association Journal

VOL. XI. TORONTO, JANUARY, 1921 No. 1

FOREWORD

WITH the present issue, the Canadian Medical Association Journal is entering on a new phase of its history. Apart from assuming a new dress, and, we trust, a more attractive form, its scope is intended to become more than ever Dominion-wide in interest and national in significance.

For the first time, the concerted efforts of all the provinces have been directed towards the maintenance of a single national journal, which shall become the expression of Canadian medical thought, and shall voice the best that the members of our profession have to give.

It is now nearly a hundred years since the *Journal Médicale de Quebec*, published in French and English by Xavier Tessier, marked the inception of medical journalism in this country. This was followed after a very ephemeral existence by the *Montreal Medical Gazette*, in 1844, and a few years later by the *Upper Canada Journal of Medical and Physical Sciences*.

Since these early days, nearly a score of local journals have come and gone,—all worthy efforts on the part of a few enthusiastic and unselfish practitioners to raise the standard of medical thought throughout the land.

Various more or less successful local efforts finally culminated in the issue of an official organ of the Canadian Medical Association, which during ten years has struggled bravely and successfully enough, though without attaining that wide-spread support and assistance to which a national organ is entitled.

And so we come to the present plan, the result of a universal effort on the part of representatives from all over the Dominion to found a single Canadian journal that shall redound to the credit of our profession; one that shall guide medical thought and legislation, promote better understanding between the public and the profession, and create the highest possible medical standards and ideals.

With every province in joint-partnership, with an accession of interest due to the enthusiasm of representatives from east and west, and with the determination on the part of every one to obliterate local interests in favor of a great national organization, there can be little doubt as to the success of this enterprise.

The Ontario Medical Association has been especially prominent in its co-operation to bring about the present change. The whole power of their provincial organization has been devoted to the success of one national Canadian journal. Their strong and well-organized editorial board has united to aid the scheme, and has afforded an example worthy of emulation by the whole Dominion.

Each other province has already intimated a desire to co-operate; sub-editorial boards have been formed so that provincial interests may be served, as well as those of the country at large.

The Editorial Boards, however, cannot maintain a successful journal unaided. They ask at once allegiance from every practitioner in the Dominion. They beg that not only shall every practitioner become a subscriber, but that the columns of the Journal may receive worthy and interesting contributions from every corner of the country. Under

such conditions it should not be difficult to interest the members of the profession at large, and enable them to keep abreast of medical literature and current news in general.

In this way, and in this way alone, can the Editorial Board furnish a journal which will ultimately respond to the legitimate expectations of all concerned.

INTERIM REPORT OF REORGANIZATION COMMITTEE

AT the last meeting of the Canadian Medical Association in Vancouver a Committee on Reorganization was appointed to report to the meeting at Halifax next summer. This Committee, which consists of one representative from each province, has already done excellent work and hopes to more than justify its appointment before the next Annual Meeting.

Following are some of the guiding principles which have been adopted by the Committee:

(1) It is obvious that we must have a strong Canadian Medical Association, working along the lines of the American Medical Association, if we are to advance our interests as a profession.

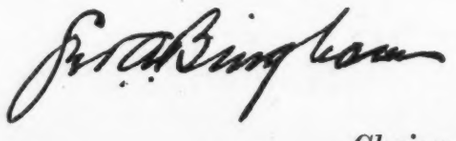
(2) To this end a much increased membership must be obtained, not only because money is required to reorganize the Association, but also, above all, in order that the interest of the individual members of the profession should be enlisted in their own National Association.

(3) The Journal of the Association must be truly Dominion wide in scope and influence and to this end an Editorial Committee must be established in each province, whose duty it shall be to secure each month scientific and practical papers that shall be of real help to the busy practitioners. A very strong Editorial Committee has already been established in Ontario.

(4) Our Journal has also another duty to perform, namely, to watch closely any legislation bearing upon the profession; to see that charlatans, under whatever name they may class themselves, are thoroughly exposed and thus prevented from exploiting the public and hazarding the lives of the ignorant and unsuspecting.

(5) Our Association must also be very much alive to its obligations to the public. A committee must be appointed whose duty it shall be to carry on propaganda in the daily press, whereby the laity may be instructed on certain vital points which are elementary to us but which are strangely unknown to the public. I refer to such things for example as infant feeding, the neglect of post-menopause uterine hæmorrhage, the use of cathartics in acute abdominal conditions and a score of other points, which, if properly understood by the public, would save many a life and make the work of the physician and surgeon easier and more successful.

(6) A single fee should, in our opinion, cover membership in both the Provincial Medical Association and Canadian Medical Association. What the fee should be and how apportioned is a matter for consideration.



Chairman.

THE ONTARIO MEDICAL ASSOCIATION ENTERS INTO ACTIVE PARTICIPATION IN THE JOURNAL OF THE CANADIAN MEDICAL ASSOCIATION

ON behalf of the Executive Committee of the Ontario Medical Association, we have much pleasure in announcing to our members, and to the profession generally throughout the whole of Canada, that we have gladly accepted the opportunity offered by the Executive Committee of the Canadian Medical Association, to unite with them and the officers of the various Provincial Associations to assist in the development of a National Medical Journal, representative of the whole Dominion.

As we understand it, this undertaking is merely an enlargement of the privileges which we have enjoyed for several years under the terms of our affiliation with the parent Association.

The various steps leading up to the elaboration of this policy will be gladly presented to any one who is particularly interested and undoubtedly will have been discussed thoroughly in general session of our Association before this announcement reaches you.

Briefly, may we state that it was impossible to complete satisfactory arrangements with the publishers of the *Canadian Medical Monthly* according to the instructions given the Executive Committee at the last general meeting.

We believe that the National Journal offers an excellent medium for communication from our Executive Committee to the members whereby we can keep them constantly in touch with the developments of our organization, both in so far as it affects ourselves and the community at large, whom we hope more efficiently to serve.

Our participation in a real Canadian Journal, including in its pages the best efforts in scientific medicine of the profession, undoubtedly will be a great stimulus to our progress as a live provincial organization and a strong integral part of the Canadian Medical Association.

The present policy of the Ontario Medical Association has largely to do with the stimulating of general interest in all that is best in modern medicine. We hope to carry our plan of post-graduate education into every local unit, and by means of literature of the day and frequent meetings of these local units, to assist in the development of a higher type of medical practitioner. . . . The public unquestionably should be protected against the "quack" and the incompetent, including any who may be found within our own ranks.

The Executive Committee has appointed a strong Editorial Board, which has signified willingness to undertake the literary effort on behalf of the Association.

We commend these gentlemen to you and earnestly request your complete co-operation with them.

Submitted on behalf of the Executive Committee of the Ontario Medical Association.

President.

THE REORGANIZATION OF THE JOURNAL OF THE CANADIAN MEDICAL ASSOCIATION

THE question of putting before the medical profession of Canada a journal which shall be comprehensive, and inclusive of details of general and local interest has occupied the minds of the editorial board of the Journal of the Canadian Medical Association for some time. It was felt that too much dependence upon foreign medical journals for certain details was slowly but surely enticing Canadian readers of medical matters to the great detriment of our own productions. It was further felt that a united support of the Canadian journal which has worked hard and long to keep up a proper Canadian standard was something to be properly cultivated; with real foresight they have appealed to the provinces to take a share in creating what we hope will develop into a representative and satisfying medical journal, one in which Canadians will prefer to see appear the products of their hands and heads, and one in which they can readily look for discussion and dissection of current activities in medical and surgical lines and for the detailing of matters pertaining to the profession at large or even to their own districts.

In pursuance of this idea provincial boards of editors have been organized, whose business it shall be to contribute a provincial section to the Journal, all matters from a province coming through their hands and appearing as a contained unit in each issue; Ontario, as having more than half of the English speaking physicians of Canada within her borders will naturally be entitled to a share of the journal matter proportionate to this number; with the planned increase in size of the issue there should be no difficulty in finding place for the contributions of each province as they arrange and organize their machinery.

The Ontario organization, ready to take up work with the MacMillan Company in issuing for the Ontario Medical Association an official journal, becomes the contributing body from this province, the above mentioned company being unwilling to proceed further with the plan discussed and adopted at the May meeting; into their hands, as board of editors, will now go all contributions from Ontario, and upon them devolves the duty of filling properly the Ontario section of the new issues.

In discussing the whole matter it might be briefly said that it seems an excellent opportunity to employ our editorial machinery in what must be recognized as an attempt to realize some co-ordination in producing a national medical journal of standing. Such a journal must be in existence in Canada if we are to claim the recognition in the world's medical circles which we desire and with the body of workers and students now developing in our country it cannot be long before there will be crying need for others, perhaps of a more distinctly provincial nature.

Norman B. Gwyn

Chairman, Editorial Board, Ontario Medical Association

AN INTERPRETATION OF SOME GASTRO-INTESTINAL SYMPTOMS

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IN what must necessarily be a very short sketch of the interpretations that can be placed upon some of the symptoms commonly associated with gastro-intestinal disease, it is necessary to rapidly review the development of the gastro-intestinal tract. The gastro-intestinal tract develops from two ingrowths of associated epiblast and nerve cells. The anterior one arises from the pouch just back of the last gill arch. This grows backward to the region of the tenth dorsal somatic area, there to join with the corresponding ingrowth of epiblast and nerve cells which arise posteriorly in the sacral region. These epiblastic ingrowths are originally derived from the appendages of the anterior and posterior somatic areas and are accompanied by those displaced motor nerve cells which are known as the bulbar and sacral outflows of the autonomic system; accompanying these there are sensory nerve fibres whose nerve cells remain within the central nervous system. In the early

FIG. I.

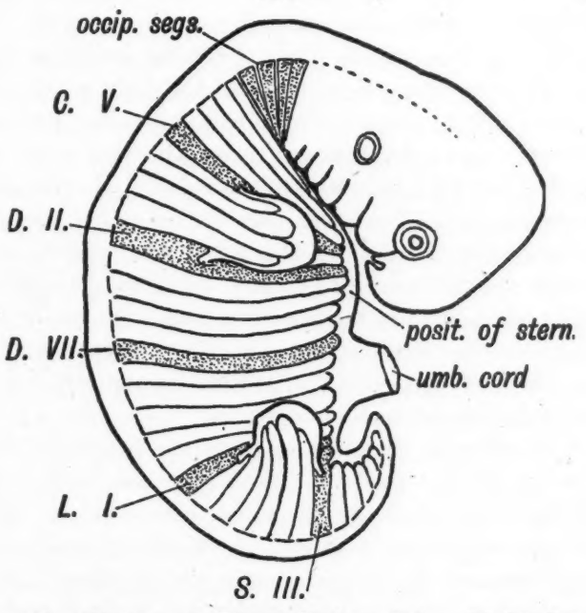

FIG. 392.—Diagram of a Human Embryo (5th week) showing the arrangement and Extension of the Mesoblastic Segments. (After A. M. Paterson.) The first and last of each segment entering into the formation of the limbs is stippled. The position is indicated in which the sternum is formed.

(*From Keith's "Human Embryology and Morphology"*)

stage of this development when these ingrowths are passing backward or forward through the embryo, they do not seem to come into intimate relationship with the structures of the somatic areas through which they pass, but later in their development to become fully functioning structures they incorporate supporting structures (that is, the connective tissue cells) and the nerve fibrils supplying these supporting

FIG. II.

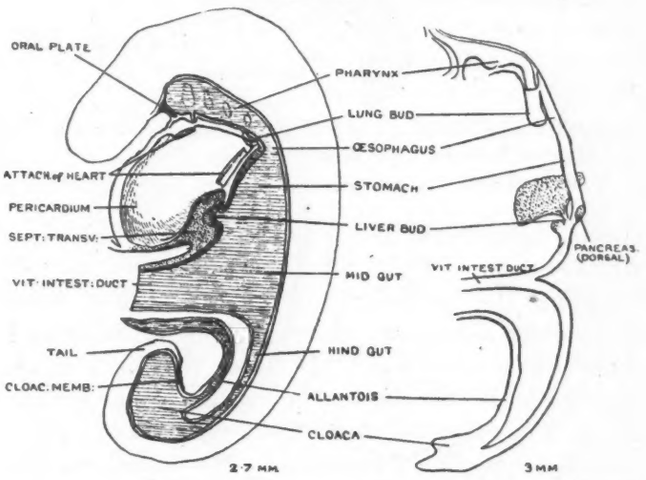

FIG. 236.—The Alimentary System of a Human Embryo 2·5 mm. long, and near the commencement of the 3rd week of development. (Professor Peter Thompson.)

FIG. 237.—The Alimentary System of a Human Embryo 3 mm. long, and about the end of the 3rd week of development (After Professor Broman.)

(*From Keith's "Human Embryology and Morphology"*.)

structures from the somatic areas in which they are lying when this secondary development into adult stage is taking place, and during this development there penetrates into the tissue of the tract and between the cells, the blood vessels and their corresponding nerve supply derived from the thoracic lumbar autonomic outflow, namely the sympathetic system under the old nomenclature. Thus, the gastro-intestinal tract has two motor nerve cell supplies; first, those coming from the bulbar and sacral autonomic outflows which accompany the original epiblastic ingrowths; second, the motor nerve cells derived from the thoracic-lumbar autonomic outflow controlling the blood vessels and certain smooth muscle fibres associated with these; the latter muscle cells become incorporated with the original gastrointestinal ingrowths, but only a few remnants are left in the adult, namely, the sphincter muscles at the ileo-cæcal valve, the internal anal sphincter, that of the bladder, and possibly there are fibres incorporated in the pylorus, and at the junction of the cæcal colon with the colon proper. These two groups of motor cells are far displaced from the original central nervous system and lie on or within the walls of the gastro-intestinal

tract in the case of the bulbar and sacraloutflows, or inganglia in the case of the thoracic lumbar outflow.

There are apparently three sources from which the

FIG. III.

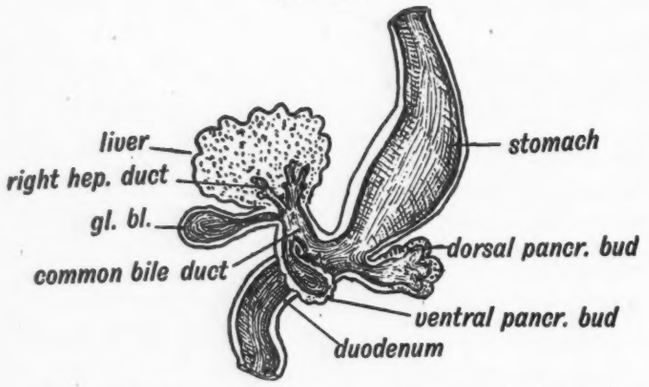

FIG. 253.—The Pancreatic and Hepatic Processes of a 4th week Human Embryo. (After Kollmann.)
(From Keith's "Human Embryology and Morphology.")

sensory nerve fibres are derived, all the nerve cells of which remain within the central nervous system, including the posterior root ganglia. First, those fibrils which accompany the original ingrowths: Second, those which accompany the blood vessels and are associated with the thoracic lumbar autonomic system: Third, those derived from the somatic areas which provide supporting structures to the specialized and fully developed secondary outgrowths of the gastro-intestinal tract.

As I mentioned, the primary ingrowths develop from the anterior and posterior appendages without any intimate relation with the somatic areas, and join each other in the region of the tenth dorsal

FIG. IV.

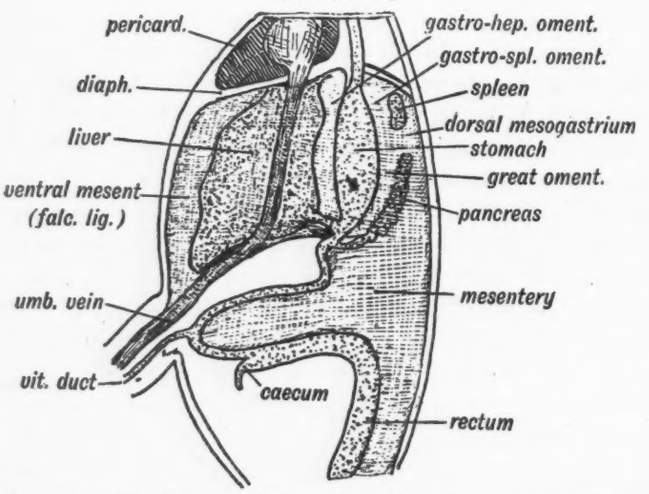

FIG. 251.—The Relationship of the Spleen, Pancreas and Liver to the Mesogastrium in the Embryo.
(From Keith's "Human Embryology and Morphology.")

somatic area; before the secondary development takes place the great growth in length gives rise to an "S" like curve in the anterior ingrowth, the upper part of which passes to the left in the region of the fifth dorsal somatic area, crosses the mid line to the right about the seventh or eighth dorsal and recrosses the middle line from right to left in the region of the tenth dorsal, passing upwards frequently as high as the seventh and eighth left dorsal, terminating at this point in the cæcum. It is from the lowest point of this latter curve that the earliest of the secondary developments take place; that is, the vitelline duct whose relation to the tenth dorsal somatic area is made evident by its passage through the abdominal wall at the umbilicus. A remnant of the vitelline duct is Meckel's diverticulum, which is occasionally found situated about eighteen inches from the ileo cæcal valve.

From the above one sees that from the lower end of the esophagus to the cæcum, the gastrointestinal tract, with all the important outgrowths of it, get their full development in the region included between the fifth and the tenth dorsal somatic areas, while the "S" like curve of this early development determines whether the somatic nerve connections be on the left or right side. The lower end of the œsophagus is developed near the middle line. The stomach mainly develops on the left from the sixth to the eighth segments. The outgrowth, which becomes the gall bladder and liver develops dorsally, and grows out to the right, so that the liver obtains its supporting elements from the eighth and ninth dorsal segments and from that abberant muscle, the diaphragm, which originally developed in and has its innervation from the fourth and fifth cervical somatic areas. The gall bladder, less extensive in its growth, develops near the middle line, obtaining its structural support from near the mid line of the right ninth and tenth somatic areas. The small intestine has an extremely rapid development in length much removed from the tenth dorsal somatic area in which it originally developed, while the lower part of the ileum, cæcum and appendix develop in the left ninth, eighth and seventh somatic areas. The final position of the fully developed and adult structures has no particular relation to the somatic areas in which they come to rest, the only connection with these apparently being that of their peritoneal covering.

You will note that it is a very short portion of the gastrointestinal tract from which the most important structures involved in digestion arise, being only that part which had relation to the seventh to tenth dorsal somatic areas, and it may be presumed that there must be a very close relationship in innervation and correlation of function of the structures from the pyloric antrum to the ileo cæcal valve. Also that there must be an intimate connection between these gastrointestinal structures whose origin was from the anterior appendages and those adult structures which have developed from the anterior appendages (or the gill arches); that is, all the mouth, pharynx and nose parts.

The physiologists, pathologists and clinicians have worked for a long time upon the question of sensation

in the gastrointestinal tract. There seems to be no common sense of touch such as exists in the skin. The sensations of pain and discomfort mainly arise from sensory endings lying in relation to the muscle structures and receiving their stimuli either from spasm or acute stretch of these elements, but there is distress, soreness and tenderness which evidently is not related to the muscle, and these are always accompanied by a sensation of distress or pain set up in the somatic area in which the affected structure underwent fts secondary development.

With this necessarily short and rather dogmatic statement of the development of the gastrointestinal tract you may not be in complete agreement, but it will at least give some rough foundation in developing explanations of the signs and symptoms which arise in disorders of the gastrointestinal system.

I wish first to take up the symptoms of belching and regurgitation, calling your attention to the necessity of determining the exact period of functioning at which these occur. In the taking of food it requires a force equivalent to twenty-six centimetres of water to pass the first bolus through the guard muscle at the end of the œsophagus. Less force is required for the second bolus, and after a number have passed, the cardia becomes completely relaxed and the food passes readily into the stomach. It is not until some minutes after the meal has been finished that the cardia again contracts firmly.

During the period towards the end of the meal or immediately after the meal there may be a rush of air up the œsophagus. This type of belching is without effort, frequently involuntary and consequent upon the rapid swallowing of a large meal. Once it was looked upon as a sign of a hearty eater and as a compliment to the provider. It is not a sign of gastrointestinal disturbance; rather is it a sign of gluttony.

The regurgitation of "sweet" mouthfuls is of the same mechanism; that is, before the cardia contracts again material can readily escape from the stomach on the slightest increase of tension within the stomach or the abdomen. Regurgitation which occurs later when the hydrochloric acid is being secreted will be sour; and later still when digestion of protein has gone on to the formation of peptones and peptides the regurgitation will be bitter and scalding, giving rise to the well-known heartburn,even though the quantity of material may not be sufficient to reach the pharynx.

Belching which occurs some time after the meal is brought about by quite a different mechanism. At this stage, the stomach, which had been continuously relaxing during the process of eating now develops tonic contraction, and the cardia is tightly closed. If this tonic contraction becomes excessive, *i.e.*, hypertonic throughout, or if the patient is hypersensitive to moderate contraction, he has the sensation of acute distention, with or without the signs of bloating. There is usually no more air in the stomach than occurs normally. The patient seeks to gain relief from the distress of this acute tension. He swallows air, forces the cardia, increasing the distention of the stomach; then before the cardia can close down again he by voluntary contraction of the chest and abdomen forces out some of the air, leaving the stomach partially relaxed, but with no less, or very little less,content of air than before the manœuvre. Again the stomach contracts and increases the tension. Again the patient feels the distress and repeats the process.

The distress in the case of belching is not acute pain as a rule and is usually felt high in the intercostal angle and to the left, frequently with distress or tenderness in the left back. The heartburn is usually felt post-sternally, frequently with soreness in the back on the left side; but as a rule the majority of patients definitely locate it in the œsophagus if the material passes upwards beyond the lower two inches of the œsophagus.

In the majority of histories the writers are content with the terms "the appetite is poor", "the appetite is fair", or "the appetite is good", usually leaving out the qualifying statements. The qualifying statements are absolutely necessary as there are many conditions which are classed under the term "loss of appetite". In the condition known as hunger the whole stomach wall is over contracted and most markedly so in the pyloric antrum, with some evidence of periodic peristaltic waves. The typical state of the stomach in normal *loss of appetite* is that the stomach is full to moderate tension and developing its normal peristaltic waves. Now, if for any reason there be marked relaxation of the muscles of the stomach, as in atony, and that from whatever cause, there will be a loss of appetite which is not distressing, and is merely the absence of hunger. On the other hand, the stomach may be over-contracted with the pyloric antrum contracted out of proportion to the rest of the stomach, and the patient complains of a "goneness, sinking and gnawing sensation", which they often describe as a "false hunger" or a "sickish hunger". This frequently occurs before meals in people who have continuous gastric secretion or who are in a state of anxiety or dread. As a rule the patient feels that he should eat, but the sight of food by increasing the tonus of the stomach, may give rise to waves to nausea. As the stomach in such cases usually refuses to relax as he swallows he feels filled and satisfied with a few mouthfuls. In both of the above conditions we know that the symptoms have a definite relation to the state of functioning of the musculature of the stomach, but this does not indicate any lesion of the stomach; usually it is brought about by a reflex stimulation from other portions of the gastrointestinal tract or by psychic influence.

Another form of loss of appetite occurs in the patient who is hungry, wishes to eat, but is afraid to eat because of the subsequent distress and pain.

The pain that patients complain of in the epigastrium soon after eating should be enquired into minutely, because distress and discomfort is so frequently complained of as pain. Actual pain arising from the stomach is only associated with first, acute local muscular spasm when the whole area becomes hyyertonic or when strong peristalis passes over the area such as so frequently occurs with ulcer, simple or malignant, which are deep enough to invade the muscle coat; or second, with violent spasm of the whole stomach, with or without reverse peristalsis; that is, actual pain is only associated with acute contraction or acute distention of the musculature. All ulcers do not give rise to pain. If the ulcer penetrates only the mucous membrane or if it has penetrated the muscular coat as far as the peritoneum, there is no marked irritation of the muscle, and consequently no spasm; hence no pain. If the ulcer be situated in that portion of the stomach, the cardia, where the muscle is not easily stimulated to violent local spasm and where peristaltic waves are very feeble, little or no pain is felt.

The pain arising from the stomach in the case of local disease of the stomach will occur when the stomach is at the height of muscular functioning; that is, when there is general contraction of the musculature with waves of peristalsis sweeping on to the pylorus, thus violently increasing the local spasm and the local tension. That is, the pain is never directly due to the irritation of nerve endings by the stomach content coming in contact with the ulcerated surface, but is due to the cramp or stretching of muscle, and will be present when the muscle is in active peristalsis and will subside as the peristalsis subsides. The same character of pain would develop if there is marked obstruction at the pylorus due to pyloric spasm or any mechanical blocking. Where this pain is due to local stomach lesion there is local tenderness with referred distress to the left, tenderness at the posterior branches on the left side in the region of the fifth, sixth, seventh and eighth dorsal roots; and there will be marked local pain and tenderness if the peritoneum has become actually inflamed.

The sense of nausea is associated with a marked spasm of the whole pyloric antrum with increased tension in the fundus and cardia, and no peristaltic waves can be noted. As the spasm at the pyloric antrum increases so does the sense of nausea. Then reverse peristalsis may set in and become violent, sweeping towards the cardia producing acute nausea, distress and pain, and with these all the general reactions with which you are familiar. Then suddenly the chest and abdominal walls contract violently, increasing the stomach tension so greatly that the cardia is forced and the act of vomiting accomplished. If this disturbance of the functioning of the stomach is the result of muscle spasm in other portions of the gastrointestinal or in associated organs, being purely a reflex from such an irritation, then the marked collapse and inhibition which follows the phenomenon of vomiting may relax such a spasm, and for a time the patient obtains ease, but if the irritation be due to other causes vomiting is not likely to give relief from the symptoms. (The sense of nausea can be produced during operation under local anæsthesia, when clamps compress the walls of the pyloric antrum.)

The pain which occurs in the epigastric region late after a meal when the stomach is empty or nearly empty is of the same type of pain that occurs in the spasm or stretch of any smooth muscle tissue, and the most characteristic type is that due to the spasm in connection with duodenal ulcer. The former speaker has described fully the functioning of the duodenum, and you can understand how tonus and peristalsis in this first portion of the duodenum are active towards the end of stomach digestion, but with the pain comes a sensation of entirely different origin. The irritation of the duodenum interferes with the normal functioning of the stomach, causing it to be hypertonically contracted with slight but active peristalsis, and producing a sense of hunger, so that the typical duodenal ulcer pain is spoken of as a hunger pain; that is, we not only have the symptoms of duodenal spasm but a special type of reflex in the stomach musculature which is associated with, if not the cause of hunger sensation.

Similarly, in gall bladder irritation we have symptoms arising directly from the gall bladder, and symptoms which develop because of a reflex disturbance in the muscular functioning of the stomach. The disturbance of the muscular functioning of the stomach due to gall bladder irritation is different from that arising from irritation of the duodenum. As a rule it is a hypertension of the whole musculature, without the excessive antrum contraction such as accompanies duodenal ulcer. The intragastric tension is greatly increased and the patient suffers from a sense of distress which he seeks to relieve by belching, but the irritation may become so great as to provoke the pyloric antrum to excessive contraction, even to setting up reverse peristalsis, giving rise to a sense of nausea which may go on to vomiting.

I would like to call your attention to one symptom in connection with gall bladder disease, and this is a sense of ravenous hunger which makes the patient feel like snatching at his food, and frequently he is hungry in a few minutes after his meal. In all cases where this symptom has been prominent operation has revealed that there was a gall stone lodged in the beginning of the cystic duct. Cholecystitis which merely involves the mucous membrane rarely produces gastric symptoms and very few localizing symptoms or signs, but as soon as the muscle is interfered with or there is an obstruction, gastric symptoms develop, and these symptoms may continue after removal of the gall bladder, apparently because of involvement of the wall of the ducts.

Physiologists and pathologists have not as yet thrown any light upon the interrelationship between the gall bladder and the colon, but from clinical experience one is left with the impression that some intimate relationship exists, for it is found that chronic gall bladder disease and the so-called mucous colitis are so frequently associated that any continued mucous excretion is looked upon as presumptive evidence that gall bladder disease exists. Some clinicians are inclined to believe that colitis is the primary factor and gall bladder disease the secondary, but in my experience a close examination of the history of the patient reveals evidence of gall bladder disease long before the occurence of the mucous colitis.

I would like to add a word of warning as to the significance of belching. One so often hears that belching is characteristic and diagnostic of gall bladder disease. Such a statement is misleading. While belching occurs in many cases of gall bladder disease there are many cases of gall bladder disease without belching and there are many cases of severe belching without any gall bladder disease.

Delay of the bowel content in the ileum caused by obstruction or by regurgitation from the cæcum gives rise to disturbed stomach function, spastic at first, atonic later, with loss of appetite. In the case of obstruction in the lower ileum the patient usually relishes his breakfast but has no appetite for his lunch or his evening meal. If the moon meal be omitted he will be hungry for his evening meal and eat heartily. The success that has attended this procedure is the probable origin of the two-meal cure.

In the case of long retention of the content in the ileum due to regurgitation the patient wakes in the morning with some lower abdominal distress and without any appetite for breakfast, but as the day goes on his discomfort decreases and he is able to take a moderate lunch. Sometime in the afternoon he develops a sense of wellbeing. In following such cases where barium has been given, this time corresponds to the complete emptying of the ileum.

In both cases the referred distress is in the upper left quandrant and in the left back.

The symptoms that arise in the case of appendicital irritation may be of three types. First, the symptoms arising from the reflexly disturbed function of the stomach which are felt in the epigastrium. Such are the symptoms with which an acute attack of appendicitis begins—epigastric pain, nausea and vomiting. Yet we may have in the more chronic cases distress felt in the left epigastrium and with tenderness over the posterior branches of the seventh, eighth, ninth and tenth left dorsal roots without any apparent disturbance of stomach functioning. These are probably due to the irritation of the endings of the nerve fibrils supplied by the somatic areas in which the appendix developed to adult type. The third set of symptoms in appendix condition are those which develop locally in the lower right quadrant and are due to involvement of the peritoneum in the neighbourhood.

In a general way, many of the signs and symptoms which arise from gastrointestinal disease are due to disturbance of muscular functioning of the stomach and hence must lead to a great deal of confusion if they are merely enumerated, but if they are definitely arranged with regard to the phases of gastro intestinal functioning the clue is soon obtained and it becomes possible to diagnose two or more different conditions existing in the same individual. Besides the symptoms of disturbed gastric function there are the localizing symptoms due to the reflexes which are produced in the somatic area in which the different portions of the gastrointestinal develop, and those due to the involvement of the peritoneum, by reason of inflammmation or adhesions that are the result of former inflamation. Thus, the distress that is felt about the right shoulder and the tenderness under the right costal cartilage with a reflex distress extending directly upwards is indicative of liver involvement, while in gall bladder disease the distress, soreness and pain is along the course of the eighth, ninth and tenth right dorsal nerves with local tenderness under the right costal margin closer to the middle line with referred distress to the left epigastrium and præcordium. Never does irritation of the gall bladder give rise to shoulder pain. If this shoulder pain does exist it is indicative of liver involvement.

No history of gastrointestinal disease can be complete without an accurate record of the disturbances in childhood. Vomiting attacks which cannot be ascribed to a definite cause and which are usually said to be due to the child having eaten something that had disagreed with him, are ninety-nine times out of one hundred due to appendicitis. The so-called bilious attacks not ushered in by the migraine type of headache are nearly always due to cholecystitis. A history of malaria in a non-malaria country or a history of intermittent fever is very common in cases who are evidently suffering from chronic gall bladder disease. Such children in their later teen's are usually free of all gastric disturbance, though frequently one gets the statement that they had to be careful of what they ate. Later they become subject to stomach trouble and indigestion. The history of the case should also include an exact description of the attack, its duration, the intervals between attacks, the exact timing of the symptoms with regard to gastrointestinal functioning, and whether the character of the attacks have changed materially. With an accurate history and a clear conception of the development, the interrelationship and the functioning of the different parts of the gastrointestinal tract, it is possible to arrive at an accurate diagnosis, not only of one condition but of two or three conditions existing in the same patient, and for all of this we have to thank not the clinician so much as the embryologist, the physiologist and the *x*-ray expert.

THE DIAGNOSIS OF GASTRIC ULCER

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PERHAPS no subject in clinical medicine arouses more practical interest than does the subject of gastric ulcer. The clinician striving for a diagnosis often finds the history difficult to unravel, the symptoms dubious, the physical signs uncertain and the chemical findings leave him more than ever in doubt. Nay more, one must confess that even surgical exploration not infrequently fails to elucidate the diagnosis. It must be admitted that there are many cases of gastric ulcer so small and so acute in their development that even to the surgical touch the diagnosis is not clear. Many of you who are here will remember seeing the surgeon striving in vain to find the ulcer which he felt sure from the history and physical signs must be an obvious one not only to the touch but to the naked eye.

So much have we been given to rely upon short cuts in diagnosis, that in many clinics the use of *x*-rays has been given a position of prime importance in the diagnosis. It is for this reason that it seems to me well worth while to open up a discussion as to the relative values of the means of diagnosis hitherto employed.

Our several means of diagnosis, taking them in the order in which they would be applied are the *history*, the *bed-side examination*, the *laboratory* tests and the rœntgenological examinations.

In a careful analysis of the cases on record at the Royal Victoria Hospital, Montreal, we have been very much struck with the fact that the history itself in many cases has afforded little, if any, satisfactory evidence of the presence of an ulcer. Many times the first indication has been a violent hæmatemesis, or perforation, where a record of any previous disturbances of the stomach has been wanting. At other times again, the diagnosis was made from the history of definite recurring pains with vomiting, and, indeed, the pains have even been localized, so much so that the diagnosis has seemed to be beyond any doubt. Here again, however, on not a few occasions surgical interference has revealed the error in diagnosis, while at other times when the operation was deferred, the patient has been seemingly cured without the usual procedure, which one regards as necessary for the healing of an ulcer.

As for the character of the *pain*, that, too, presents the widest variations in the history, and it can hardly be said that any pains are characteristic beyond that which is present in cases of hyperacidity—I mean by that the hunger-pains which are so frequently present where ulcer exists. In cholelithiasis, in neuroses, and in other conditions where irritation of the gastric mucosa is present, the pains may simulate the pains of gastric ulcer. In the hospital cases pain was complained of in all cases, but its character depended a great deal on the individual. In regard to the relation of pain to food, in about 60 per cent. of cases the pain was said to be worse *after* taking food. In 10 per cent. the pain was *before* food, but pain was also described as being *constant* or *not affected* by the taking of food.

A history of vomiting, although considered by most authors to be a very constant symptom, occurred in only about 50 per cent. of our cases. The vomitus was said to consist of food taken shortly before, but very little could be learned of its characteristics except when blood was present which happened in about 10 per cent.

The history gives us a clue and when there is hæmatemesis, or perforation, the diagnosis is more easy but these late complications are not so likely to happen when the patient is under observation and perhaps being kept at rest and on a light diet.

We have all seen cases of ptosis or of mucous colitis or chronic appendicitis where the history of pain and digestive disturbance differs in no way from that which we often get with gastrice ulcer. It is these cases which tax our means of diagnosis and makes it necessary to search for and exclude one by one the special signs of those different diseases.

In our cases the history was most often a long one of definite digestive derangements, very frequently with remissions but with little return to normal. *Pain* was in all cases insisted upon as being a constant symptom, and in a large percentage of cases there was a history of hæmatemesis more or less severe which by a process of exclusion would almost clinch the diagnosis.

The clinical examination of the patient gives us much valuable information, both for and against the diagnosis of gastric ulcer. *Tenderness* is a very constant sign and one on which stress should be laid. In our own cases it was present in practically all cases. It was nearly always well marked, worse on pressure and situated in the upper part of the abdomen and generally in the epigastrium. The degree of tenderness varied, as might be expected, with the patient but no report describes the tender-

ness as being confined to a small circumscribed area. These reports have mainly to do with public ward patients, many being more or less uneducated and unintelligent persons, but that this much insisted upon circumscribed tenderness did not appear at all is worthy of consideration.

Sir James MacKenzie in his book, "Symptoms and their Interpretation", says that the position of the ulcer determines the point of tenderness, which therefore is not a fixed point clinically, being situated more to the left or right according as the ulcer is at the cardia or pylorus. On the other hand, although a larger proportion of the cases reported were drawn from an unobservant class, Bassler of New York makes the statement, that only the more definite cases of gastric ulcer present themselves for treatment, a proportion which he estimates as about 25 per cent. of all cases.

With reference to the acidity, here, too, the greatest variations may exist, and while it has generally been accepted that hyperacidity is a fairly constant accompaniment to gastric ulcer, our own experience has shown that in many cases of ulcer, the acid may be normal, or even subnormal.

Much stress is laid by many authorities upon the presence of occult blood in the fæces, and it may be true that sufficient attention in the past has not been paid to these examinations. Nevertheless, experience has shown that where the findings are negative, it does not in any sense exclude the possibility of an ulcer, but only where it is a constant finding can one say with any assurance that it is a probable indication that ulcer exists. In our cases this examination gave little or no information.

As has already been said, more and more attention is being paid to the *barium meal and* x-*ray findings*. This method of examination has been carried out in almost every one of the hospital cases during the last ten years and has come to be regarded as the most important single method of examination we possess for arriving at a diagnosis. Too much insistence cannot be placed upon the importance of the screen examination as a preferential method over that of the skiagram. By examining for a sufficient length of time by means of the fluoroscope, particularly when this is combined with simultaneous palpation of the stomach, one may judge more readily the emptying time of the stomach, the type of peristalsis, the size, shape and position of the stomach and the duodenal cap.

Dr. Pirie, whose experience at the Royal Victoria Hospital and elsewhere has been unusual, emphasizes the fact that the acute gastric ulcer, as a rule, shows no rœntgenological changes. In the subacute and more chronic types, on the other hand, much information may be gained, but this depends, too, largely upon the anatomical lesions produced by the ulcer in its development.

The more one has to do with cases of gastric ulcer, the more is one convinced that no *one* of these methods alone can satisfy. Experience has taught that reliance upon any one means of diagnosis as pathognomonic is to be avoided, and that only by a careful study of all the conditions together, can one arrive at an approximately satisfactory conclusion.

How necessary it is to diagnose these conditions correctly is shown by the results of treatment. If under medication and dieting improvement does not take place, surgery must be resorted to and where the diagnosis is correct, gives brilliant results. On the other hand, as Sir Berkeley Moynihan in a paper entitled, "Disappointments after Gastro-Enterostomy", points out, many failures are due to the operation being done where there is no disease justifying it, such as appendicitis, cholelithiasis, cirrhosis of the liver, tabes, etc., and he concludes with the remark that done in appropriate cases there will be few disappointments. The relative importance of the different means we have of making a diagnosis is frequently not appreciated. The tendency is to lay undue stress on one or more of these methods. The clinical findings are often meagre and the chemical analysis indefinite and it is only by grouping these results together that they become valuable and help us.

In conclusion then, I would insist on, in addition to a careful clinical examination, the very great importance of a carefully taken and carefully sifted history. An account of the pain and its remissions, the vomiting and the bleeding, and of the long and progresivel downward course of the disease can often be drawn, at the expense of some time and much patience, from even the most unintelligent of cases, and when this story is considered with the rœntgenological findings, it will more often than not confirm us in our diagnosis.

DUODENAL ULCER

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A LITTLE over a century ago duodenal ulcer as a clinical entity was entirely unknown. Indeed less than thirty years ago as pointed out by Moynihan the symptoms of chronic duodenal ulcer had not been recognized with sufficient certainty to enable a diagnosis to be made. It is remarkable that a condition now so well known clinically and with such a definite pathology, should have been so long unrecognized, and though first described in 1830 by one of the great men of that time, John Abercrombie of Edinburgh, it should have passed for nearly a century with little recognition until its place in medical literature was fully established by Moynihan in his monogram on duodenal ulcer in 1910.

Clinical Course and Symptoms. The clinical course in most cases of duodenal ulcer is typical; in fact as the patient tells his own story the diagnosis is often made, but there are some exceptions to this well marked and characteristic story, and these exceptions offer the greatest difficulty in making a diagnosis. These will be dealt with more fully later. Abercrombie[1] from five cases collected from the literature (and this speaks well for medical records at that early period), made the following observations: "The leading peculiarity of disease of the duodenum, so far as we are at present acquainted with it, seems to be that the food is taken with relish, and the first stage of digestion is not impeded; but the pain begins about the time the food is passing out of the stomach or from two to four hours after the meal."

The complaint is usually one of "indigestion" or distress and discomfort in the stomach, and the history of the case usually dates back a long time.

At first the symptoms come on in "attacks" lasting for weeks or months, and usually in the spring and fall of the year. In the early stages between these attacks complete remission is the rule, but later the distress becomes more or less constant. The distress or pain comes on two hours or more after meals, and relief is often obtained by the taking of food or bicarbonate of soda. A glass of milk or a soda biscuit, or both, are apparently effective in producing this relief. The patient is well and comfortable after he has dined, but while good digestion waits on appetite health does not attend both. The time at which the pain comes on may be affected by complications. Thus it is said to come earlier than two hours after food if adhesions have formed to the anterior abdominal wall, or, if there is beginning stenosis. The patient is often awakened in the night with this pain and may take some food to obtain relief. Dr. Chas. Hunter tells of one man who kept a bag of biscuits at the head of his bed so that he could relieve the pain which came on in the night. The cause of this so-called "hunger" pain is often attributed to food passing over the ulcer, but *x*-ray examination has shown that food passes out of the stomach and over the ulcerated surface of the duodenum within the first few minutes.

The pain is epigastric and may be referred to the right side and up to the right breast. In the earlier stages vomiting is very frequent. Later when stenosis has developed vomiting is a constant symptom. One must constantly keep in mind when considering the symptoms of duodenal ulcer, the pathology from the initial stage of duodenal irritation to the final stage of a contracted healed ulcer causing pyloric stenosis and all that may occur during the intervening period. Hæmatemesis occurs in a few cases when with the pylorus relaxed blood regurgitates from the duodenum into the stomach, but more frequently malena is the indication of hæmorrhage. Faintness, pallor and sweating may also indicate hæmorrhage and precede the passage of tarry stools. One patient, a medical man himself, was found in a state of collapse on the floor of his office from hæmorrhage, the first real indication that he had a duodenal ulcer. A profound anæmia with slight indigestion has been seen and malena only discovered later by accident.

Eructations of sour or bitter fluid and gas are very constant.

Variations from the typical occur when the ulcer is situated in the second part of the duodenum, the pain may be spasmodic in character and jaundice may be present. In these cases the symptoms may simulate those of gall stones. There is a group of cases in which the only complaint is one of "acidity" or "heartburn", sometimes slight and easily controlled by bicarbonate of soda or bismuth, sometimes severe and very troublesome. From some of these a history of attacks of hunger pain might be elicited by careful enquiry. Another group of cases seek medical advice for repeated and copious vomiting, the result of cicatricial stenosis and only on a careful investigation can a previous history of "indigestion" or "acidity" be obtained; the active ulcerative stage being passed with little inconvenience to the patient.

In another the symptoms are very vague and indefinite and usually those of indigestion without any

suggestion of an organic basis, while in still another and smaller percentage there may be no symptoms until hæmorrhage or perforation has occurred.

There is a smaller percentage of cases with history of ulcer where its location cannot be determined. The pain of a prepyloric ulcer usually comes on earlier and may also be relieved by the taking of food.

While the clinical history usually spells the diagnosis the thorough investigation in every case will call for, in addition, a careful physical examination of the patient with tender points noted and complications or concomitant lesions looked for. Gastric acidity tests, examinations of gastric contents and fæces for blood, and lastly, and second only in importance to the clinical history,—a careful *x*-ray examination.

The physical examination in this condition may be entirely negative, and with the usual healthy appearance that these patients present the condition may be overlooked. There is usually some tenderness in the epigastrium and to the right over the duodenum. As a chronic appendicitis is so frequently a concomitant of this disease some tenderness is frequently found about McBurney's point.

It is our routine to make gastric acidity tests in all stomach cases, and we have found hyperacidity in approximately 80 per cent. of ulcer situated near the pylorus.

We have not found the examination of fæces for occult blood of practical value. Occult blood may occur from so many sources from the mouth and nose to the anus, that its value as a diagnostic sign is lost. Blood appearing for one day and absent for one or more days to reappear is suggestive of ulcer, while blood found constantly in the stool is suggestive of malignant growth.

X-ray examination by an experienced rœntgenologist is of the greatest importance in confirming or making a diagnosis. In the first place clear plates are taken of the whole abdomen. This by a process of elimination, excludes diseases of the spine, kidneys, ureters and bladder that are demonstrable by this method. I know of one case where the precaution of first taking plates was omitted, a barium series was done and a stone in the kidney was missed.

The chief point in making the diagnosis of duodenal ulcer from the *x*-ray standpoint is deformity of the duodenal cap. This, if constant at all examinations, would be almost pathognomonic. The only other condition that causes persistent deformity of the cap is adhesions, and this while common in the second part of the duodenum in pericholecystitis, is very unusual in the first part except when due to ulcer. I believe a spastic incisura may occur in the duodenum as well as in the stomach in chronic appendicitis and gall stones. This, however, would not be constant and would be relieved with atropin.

Hyperperistalsis is invariably present, and there may be hypermotility especiallly in the initial stages, the stomach emptying in two or three hours. Later pyloric spasm may cause hypomotility and there may be a four or even six hour residue, and that without organic stenosis.

Akerlund[2] commenting on the local spasm that may be induced by duodenal ulcer, and on the distant spasm which it may induce in the body of the stomach says, "that the local spasm at the site of the ulcer explains some of the symptoms of duodenal ulcer. It occurs as spasmodic contraction of the stomach with gastric ulcer. A rœntgenogram showing local constricting spasm in the bulbus of the duodenum, accompanied by local tenderness, is convincing proof of duodenal ulcer, he thinks. This spasm causes a characteristic scalloped outline in the rœntgen shadow of the upper duodenum; there seems to be always a round protruding bunch which represents the ulcer itself, the spasm nearly closing the lumen of the duodenum just above and below this knob-shadow. The pylorus is generally wide open. The spasm of the region of the duodenal ulcer explains the initial hypermotility and the 'paradoxic' four hours' retention, the spasm coming on gradually as digestion progresses, after the hypermotility at first."

Differential Diagnosis. In differentiating duodenal ulcer from gall stone disease many points must be considered. With typical attacks of cholecystitis there is no difficulty. Here too the attack frequently comes on in the night but there is no regularity as in duodenal ulcer, and the pain is usually sudden in onset and severe and ceasing abruptly. The cases which cause most difficulty are those of cholelithiasis associated with hyperchlorhydria and indigestion. The symptom of belching of gas is, I believe, much more marked in cholelithiasis than in ulcer. Stone impacted in the cystic duct gives a constant pain and distress in epigastrium and right hypochondrium which is usually aggravated by food and not relieved thereby as in ulcer. The pain of gall stones is usually referred to the right shoulder, not so with duodenal ulcer, though I have seen two cases of gall stones where the pain was referred to the left shoulder, and one case of duodenal ulcer where the pain was referred to the right.

Both conditions may be present and increase the difficulty in diagnosis.

Chronic appendicitis is not often confused with duodenal ulcer. There is in our observation a constant change from time to time in the type of symptoms in a large percentage of appendix cases. The patient may begin with indigestion and some gas. Later pain develops but its relation to food is not constant. Some patients give a history of food relief at one time and food excitation at another. Exercise increases the pain and symptoms in chronic appendicitis but not in ulcer. There may be hyperchlorhydria or hypochlorhydria. Patterson[3] has pointed out that free hydrochloric acid is frequently absent in chronic appendicitis. I remember operating upon in one week,

three cases of "indigestion" due to a diseased appendix, in each of which there was absence of free hydrochloric acid.

Other conditions requiring differentiation are gastric ulcer, gastric cancer, linitis gastrica or fibromatosis of the stomach, chronic dilatation, syphilis, tuberculosis of stomach, cholecystitis and pericholicystic adhesions, chronic pancreatitis and pancreatic calculus, hernia, especially those of the linea alba and umbilicus, intestinal parasites, visceroptosis and moveable kidney, renal calculus and the gastic crisis of tabes dorsalis.

If a thorough routine clinical investigation be carried out in all cases there should be very little difficulty in arriving at a correct diagnosis in at least 95 per cent. of cases.

In making a differential diagnosis in obscure abdominal conditions, it is very important to bear in mind that the patient may have more than one pathological condition present, and in fact this is very frequently the case, and then we have what Oliver Wendell Holmes used to call a snarl and tangle of symptoms.

Two of my cases of hour glass stomach had associate duodenal ulcer. One had also gall stones, and the other had a subacute appendicitis, another had extreme gastroenteroptosis, and four cases of gall stones had also duodenal ulcer as a concommitant condition.

Treatment. The prophylaxis of duodenal ulcer has probably never been discussed, but when we consider the conditions that are enumerated as causes, it would appear that a great deal might be done in a prophylactic way, the more thorough investigation and more rational medical treatment of cases presenting slight digestive disturbances, might lead to the anticipation and thus to the prevention of ulcer in a fair percentage of cases. The treatment of hyperacidity along the lines advocated by Sippy for ulcer; the removal of infected foci, such as septic tonsils, abscessed teeth, and chronically diseased appendices and gall bladders should be undertaken, not only as a prophylactic against ulcer, but for the general well-being of the patient.

When duodenal ulcer has been diagnosed, the treatment will include in addition to the removal of all infected foci by surgical or other means, a thorough course of medical treatment, and special diet, with the patient at rest in bed. Sherren[4] says that "Ambulatory treatment is certainly a failure, he having operated on two patients in which perforation occurred while under this treatment. It should be borne in mind that though the attack of symptoms has subsided, the ulcer may be by no means healed, and therefore treatment should be continued for a long time after the patient is about and apparently well. At intervals of a month or more *x*-ray examination should be made, and the progress of the case noted.

When Moynihan began the surgical treatment of duodenal ulcer it might be inferred that medical treatment of this disease had not been well developed. However, he advocated medical treatment in the first and even the second attack. More recently Friedenwald[5] gives the cure by various medical means as follows: Lenhartz 66 per cent., Leube 72 per cent., Sippy 86 per cent., and further says that cases that resist thorough medical treatment especially should be treated surgically. From this it will be seen that with increased efficiency in medical treatment, the need of surgery becomes less. There is, however, a large residue of uncured cases, and for these surgery offers definite relief.

Treatment, Surgical. Surgical treatment of duodenal ulcer that has been fortunate enough to reach the stage of cicatrization and contraction with obstruction is admittedly ideal. Gastroenterostomy which is still the operation of choice for this condition, was first performed by Codeville in 1893. It is a short circuiting operation, and the result is invariably good.

When acute perforation into the free peritoneal cavity occurs, the condition demands immediate recognition and prompt action. The question as to whether gastroenterostomy should be done at the time the perforation is closed, and whether or not drainage of the peritoneal cavity should be instituted, depends on many factors which will not be discussed here. Bloch[6] mentions as a sign of impending perforation persistent pain in the ulcer area. Subacute and chronic perforation may cause adhesions, fistula, or abscess formation, and these have to be dealt with surgically.

The operative results are by no means all that could be hoped for, yet when it is considered that the cases operated on have invariably resisted medical treatment for a long time the results are extremely favourable. Moynihan gives his results as 70 per cent. cured, 18 per cent. improved and only one case no better.

The complication of hæmorrhage should be treated medically at first. If hæmorrhage is profuse, or repeated hæmorrhages occur, operation is definitely indicated. If operation is undertaken gastroenterostomy, which has frequently been done with the hope of putting the part at rest and thus stopping the bleeding, is futile. Excision or cauterization of the ulcer should be done.

If the operation is an interval one, gastroenterostomy should be done at the same time, but if hæmorrhage has been severe and the patient's condition serious, gastroenterostomy should be done at a later date, unless the patient is relieved from all symptoms of ulcer.

While the indications for surgical intervention in the foregoing conditions are well defined, the indications in uncomplicated ulcer are still debatable. Randall Short[7] says that "medical treatment after the first attack is not only futile but dangerous. Delay is not to be countenanced. The danger of perforation is great, and frequently occurs between attacks when

the patient is free from symptoms and apparently well."

This view is an extreme one and certainly in the light of recent results of medical treatment requires modification. However, Deaver[8], in a very recent article on Peptic Ulcer reports in the year 1918 perforation had occurred in 5·2 per cent. of his cases, and says: "Every medical man of large experience, I am sure, has had the unpleasant opportunity of observing perforation occur while the patient has been in a hospital or in his own house undergoing medical treatment for what is essentially a surgical condition. The proper time for medical treatment for chronic indurated peptic ulcer is not before, but after operation (if treatment is still then needed)."

The questions to be considered are, the operative mortality, and operative results. The operative mortality for gastroenterostomy may be placed at from 2 to 4 per cent. Moynihan has probably the best record, namely 2 per cent., and in his last three hundred cases he states that he has had no deaths. Sherren had three hundred and twenty-five cases with six deaths. Against these operative results, Randall Short[9] in discussing the prognosis in duodenal ulcer quotes the statistics of various authors who placed the mortality as high as 40 per cent., and says that from perforation alone 17 per cent. died. These are the statistics of actual post mortem records, and I think it can be safely said that they are higher than would be obtained at the present time, yet they show that the condition is a very serious one.

When surgical treatment has been decided on as the proper precedure, each individual case must be dealt with on its own merits and according to the pathology found when the abdomen is opened. The operation is primarily exploratory and is essential to a final diagnosis before a definite procedure for dealing with the ulcer is undertaken. Two points should be kept in mind; namely, search for and elimination of other pathological lesions that may have an ætiological bearing; and secondly, the demonstration by sight and touch of the presence of ulcer. Unless the ulcer can be seen and felt, operation for its relief should on no account be done. Moynihan in his former, as well as his most recent writings, lays great emphasis on this point and recites cases where the operation for ulcer has been performed in the absence of any organic lesion justifying it.

The appendix should first be sought and removed. It would be better to do this through a separate small McBurney incision rather than lengthen unnecessarily the one already made. It is impossible from examination of the appendix *in situ* to exclude the presence of infection.

When in addition to ulcer, cholecystitis or gall stones are present, the condition is a more serious and complicated one. One has to decide whether to deal with the gall bladder or the ulcer, or both. No doubt the expert operator would deal with both conditions including the appendectomy, and probably successfully too in most cases, but I believe that the interest of the patient is served best by doing two such serious operations at two separate occasions. As to which should be done first depends on which lesions has been most active in producing symptoms and the actual pathology present. Thus an ulcer that had been bleeding or was tending to perforate would call for immediate attention, while one with a thick base and protecting adhesions might be left provided the gall bladder condition appeared more urgent. In the latter case medical treatment should be further tried, and if this again failed, the ulcer should be dealt with surgically.

Returning to the duodenum and stomach careful examination is made to ascertain the number, size, position and condition of the ulcer or ulcers present. Gastric and duodenal ulcers frequently co-exist. In two cases of hour glass stomach, I have had, duodenal ulcer was present in each. In these two cases in addition to sleeve-resection of the stomach, the jejunum was anastomosed to the second pouch to take care of the ulcer in the duodenum.

Another case in which I was associated with one of my confrères in the treatment, had in addition to duodenal ulcer, an ulcer at the cardiac end of the stomach. Some weeks after the operation of gastroenterostomy he developed an œsophageal obstruction. This was relieved by the passing of bougies through the œsophagescope by Dr. George Fletcher.

In considering the surgical procedures now done for the relief and cure of duodenal ulcer it is interesting to note that the operation as already mentioned, was one of short circuiting for obstruction to the outlet of the stomach. This same procedure was later applied to cases of duodenal ulcer without obstruction on the assumption that by side-tracking the gastric contents before they reached the duodenum the ulcer would be put at rest and thus given a chance to heal. Patterson, however, has shown that it is not a mechanical but a physiologico-chemical operation, in that the hyperacid gastric content is neutralized by the alkaline bile and pancreatic secretions passing into the stomach through the new stoma. Finney's operation of pyloroplasty which was originally done for pyloric obstruction seems to cure duodenal ulcer in the same way.

Wilinsky and Crohn[10] state, after an investigation of thirty-seven post-operative cases in which gastroenterostomy was perfromed, that the functional efficiency of the stomach is definitely impaired in a large percentage of cases, and draw attention to the well-known fact that the best results after operation have been obtained in cases in which some pathological process has gradually caused a stenosis at the pylorus.

They return on the whole a rather gloomy verdict for the operation of gastroenterostomy, when performed for cases without pyloric obstruction.

In my own cases on whom I have performed gastrojejunostomy for duodenal ulcer both with and without pyloric obstruction, and I have been able to trace most of them, I do not know of any unfavourable result. There were two cases that had to be re-operated; one for vicious circle three months after the first operation, and one for jejunal ulcer six years after the primary gastroenterostomy. Both of these cases are now perfectly well. The latter case I have recently seen and examined two years after excising the jejunal ulcer. He states that he has never had better health and has not been so well for fifteen years. The radiographic report at the present time on this case is as follows:

"Mr. T. B. *X*-ray findings. The stomach is normal in contour and size. The barium meal emptied through a gastroenterostomy opening which appears to have pyloric action, so that the stomach emptied in a little less than four hours. There was only a trace of the meal seen passing through the normal pylorus."

I would like to point out further in connection with this case, that at the primary operation no silk or linen was used, both rows of sutures being of No. 1 chromic catgut. Non-absorbable suture—material cannot be blamed for causing jejunal ulcer in this case. Repeated gastric analysis, however. showed a persistent high, free and total acidity.

Sherren[11] has done some extensive investigations on cases before and after operations for duodenal ulcer, and has shown that there is both a more rapid emptying of the stomach and a reduction of acidity after gastrojejunostomy and further shows that the reduction in acidity is greatest when the anastomosis is well toward the cardiac end of the stomach, and again that in eleven cases where the anastomosis had for various reasons to be done nearer the pylorus than usual, lowering the gastric acidity had not been so marked, and even a temporary increase had been noted. Examination of twenty-six cases in from four to nine years after operation had been made showed that acidity was still low. This strongly suggests permanency of this post-operative reduction of gastric acidity.

Gastrojejunostomy the posterior no loop operation is the one of choice and this alone was formerly considered sufficient to effect the healing of the ulcer. More recently, however, the majority of surgeons advocate dealing with the ulcer directly by infolding, excision, resection or cauterization and gastroenterostomy.

Bland-Sutton[12] has given up gastrojejunostomy as a routine method of treatment of gastric and duodenal ulcer, and advocates resection of the pylorus and the segment of the duodenum containing the ulcer. This I think will not be followed in duodenal ulcer by the majority of surgeons for the following reasons: It is too severe a measure for duodenal ulcer alone as simple infolding or excision seems along with gastroenterostomy to be adequate. While a justifiable procedure in prepyloric ulcer on account of the frequency of malignancy developing, in duodenal ulcer malignant change is so rare that it could not be justified on that ground. Carmen[13] has not seen malignancy developed in a duodenal ulcer, except where the ulcer has spread to the gastric side of the pylorus, and I have had only one case in which malignant disease unquestionably developed on a chronic duodenal ulcer. This patient had at the time seen obstructive jaundice from involvement of the common bile duct.

The operation that I do is the posterior no loop gastrojejunostomy, with the bowel placed contraperistaltic, that is, with the jejunum attached to the posterior wall of the stomach as it normally lies in the abdomen from right to left. In addition the ulcer is infolded with fine chronic and further protected with an omental graft. Since the year 1912 I have not used any silk or linen in my stomach or intestinal work, chromic sutures being used for both rows.

We have had in the past year or more a considerable number of cases of stomach trouble which do not give a typical history or present a typical ulcer syndrome. They have had symptoms suggestive of chronic appendicitis with indigestion, but the point about these cases is, that the *x*-ray report shows a deformed cap which may, or may not, be persistent in all examinations. The summing up of the rœntgenologist usually is, "Chronic appendicitis with possibly duodenal ulcer." In these cases we have invariably removed the appendix through a small McBurney incision without exploring, and then having the case treated medically and kept under observation, *x*-ray examination being done from time to time. In all these cases the appendix has been definitely diseased. It is too soon to report fully on the ultimate outcome in these cases, but I know that many of them have been entirely relieved of all symptoms. In this connection I would like to quote from a recent interesting article by Arthur F. Hurst[14] of Guy's Hospital, London:

"The association of chronic appendicitis with both acute and chronic duodenal ulcer is too common to be a coincidence and the greatly diminished tendency to relapse, especially of acute ulcers, following the removal of the appendix without interfering with the ulcer, shows that the appendicitis is the primary condition."

In conclusion I would like to say that the treatment of duodenal ulcer by medical means alone, or by surgical means alone, or by both, without a thorough search for, and removal of all possible causes is absolutely wrong, and will contribute to that ever present percentage of unsatisfactory cures, both medical and surgical.

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DERMATOLOGY

Treatment of Generalized Psoriasis. Mook, W. H.: *Arch. of Derm. and Syph.*, October, 1920.

The writer presents an intensive treatment of psoriasis with an ointment evolved by a London physician, from experience in a large military hospital. The ointment consists of 2 per cent. phenol, with 10 per cent. chrysarobin in petrolatum, in which the phenol acts to intensify the action of the chrysarobin. He protects against chrysarobin dermatitis with soothing applications, *e.g.*, ichthyol, corn starch and petrolatum. When applied to the face he warns especially against causing conjunctivitis. Applications are made once daily, and are discontinued on the appearance of dermatitis. He claims that the treatment should be effective in less than twenty-five days; but he makes clear the disadvantages attending use of this ointment, such as the destruction of clothing, and the necessity for hospitalization in order to control the application, and he advises its use only in connection with cases having severe symptoms, which require speedy relief.

R. E. MacDermot.

Some Studies on Lichen Planus, Based on the Study of One Hundred and Seventy-Nine Cases. Jacobs, F. M.: *Arch. of Derm. and Syph.*, November, 1920.

Jacobs can find no positive evidence that this disease has either a nervous or an infective ætiology, but thinks that the balance is in favour of a microbic origin. The histology of the lesion especially suggests this. In treatment, mercury, arsenic and the *x*-ray are all efficient. Pruritus (a symptom he found to vary widely in severity) disappeared under the use of mercury before the eruption itself was affected. In the subacute conditions, protiodid of mercury, and Fowler's solution, were always successful. In chronic cases, arsenic in the shape of Asiatic pill, was most effective. A few long standing cases were improved by the *x*-ray. Arsphenamin and its derivatives were found to be of very little value in this condition. R. E. MacD.

X-rays and Radium Combined with Excision in the Treatment of Keloids. Pfahler, G. E.: *Arch. of Derm. and Syph.*, August, 1920.

The author states that the *x*-ray and radium are the only agents known to arrest the condition, or cause it to disappear. He emphasizes the need of employing the treatment early.

The *x*-ray treatment should aim at a progressive atrophy without erythema or destructive effect on skin. In mild cases he generally uses five milliamps. of current, two millimetres of filter, with focal distance of eight inches, a parallel spark of nine inches, and a period of two minutes, repeated in three or four weeks. For older cases he increases the time to eight minutes and six millimetres of filter, obtaining where possible a cross-firing effect.

Radium gives almost identical results, and he dwells on the value of combining these two. In very large keloids he uses the *x*-ray first, then excises, and after that the *x*-ray again, to keep the scar to the level of the skin, and to prevent recurrence. He is fully alive to the danger of lupus following the *x*-ray, but claims proper screening obviates this. R. E. MacD.

THE DIAGNOSIS OF GASTRIC ULCER

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IN a discussion of the relative values of the various methods available for the recognition of gastric ulcer, I have been asked to state the case for the radiographic method. Approaching this with the confessed bias of one whose viewpoint is limited to one method of observation, I yet do so with the consciousness that in this work our results are checked and rechecked and the decision as to whether we are right or wrong is nearly always in other hands than our own. This then provides surely, a situation from which an accurate estimate of the worth of the method may be reached.

In the Department of Radiology in the Toronto General Hospital our cases come to us from two different sources. Those from the teaching wards have usually been thoroughly worked out and a clinical diagnosis made before the case is referred to us for investigation. Cases from the private wards or from private physicians are not so well worked out. But in each case a tentative diagnosis has been made, and an effort is always made to obtain this.

Thus in the majority of our cases we are able to balance the accuracy of one method against the other when the final and proved diagnosis becomes available.

In opening the discussion of the *x*-ray recognition of gastric ulcer it becomes necessary to say a word about technique, and in this I regret to have to take issue with Dr. Hardisty, but feel very strongly on this point. Our experience has been that much more accurate results can be obtained by a careful combination of the screen with serial plates. Either alone is incomplete, and will fail to provide essential information. Very elaborate series of plates are not necessary, but a serial study of one complete cycle of the events in the stomach is sufficient in ordinary cases providing the plates are made rapidly enough. This should be at a rate of not less than ten to the minute, and there is no special gain in greater rapidity than this. In difficult cases more elaborate series will be helpful. More than two years ago I adopted the method of making a series of ten plates at this rate in practically every case in combination with the same screen examination I had formerly been using. Within the first two weeks I recognized two gastric ulcers which could not be visualized upon the screen. Since that time a similar experience has been repeated so often in gastric ulcer, and so much *more* often in duodenal ulcer, that I am most thoroughly convinced on this point. Screen examination is made in the standing, prone, lateral or oblique position, whichever gives the best view of the stomach, and careful palpation with the gloved hand or wooden spoon is carried out simultaneously. The plates are made in the position which on the screen provides the clearest view of the entire stomach and of the caput. This also may be standing, oblique or prone, although it is usually the latter. If there is much spasm at the pylorus we wait until this relaxes and free function is established before commencing the series. This may be ten minutes or it may be one hour. The point is determined by the screen and during that time a written note is made of all the information we can gain regarding the stomach and duodenum, their form, function, mobility, etc., together with a statement as to whether an organic lesion can be seen or not. The final report is made from a study of the serial plates and this screen report. In this manner we have examined six thousand cases during the past two years, and an additional twenty-five hundred were examined during the preceding year when our equipment limited us to the screen.

The classification adopted has been the Mayo Classification, which divides ulcer into five classes:

1. Simple, mucous membrane erosion.
2. Indurated ulcer.
3. Penetrating ulcer.
4. Perforating ulcer.
5. Malignant ulcer.

Taking these up in turn I will admit at once that there are great difficulties in demonstrating a mucous membrane erosion, and that when these exist we usually miss them. But who is to say definitely whether or not they actually exist? The mere presence of blood is not sufficient, important though it be. The sudden profuse hæmatemesis without other symptoms is not this type, but more usually a ruptured varix. They give rise to no symptoms which are sufficiently definite to constitute a clinical entity.

Some months ago we thought we had such a case. I examined her twice, and found no trace of ulcer, yet she was having repeated severe hæmorrhages. In view of the seriousness of her condition an emergency exploration was done, and stomach opened and gone over most carefully, but no ulcer found. In a few days she died during another hæmorrhage, and at the

Read at the Meeting of the Canadian Medical Association, Vancouver, B.C., June, 1920.

autopsy no bleeding point could be found, nor was the mucosa eroded.

2. The indurated ulcer I take to be that form in which an inflammatory thickening is present including most of the depth of the mucosa, but not involving the muscular layer. This is the acute ulcer, and while in this stage may give rise to definite symptoms such as localized pain, vomiting, etc., with occasional bleeding. It does not long remain in this condition, but either heals or goes on to the next form. Even in its present form at least 50 per cent. are recognizable at *x*-ray examination by reason of the inelasticity of the gastric wall over their site. The wave of peristalsis is seen only on the greater curvature leaving a flattened area over the ulcer.

A sufficient number of these ulcers have been recognized to convince me that they can be demonstrated. If the induration is very diffuse it is more difficult, and may be impossible. This type of induration may bleed, and is the form frequently referred to as "ulceration" as distinct from "ulcer".

3. *Penetrating Ulcer.* Here we are on much firmer ground. This is the ordinary gastric ulcer which is the result of the further extension of the indurated type until the mucous membrane sloughs over a circumscribed area down to or even through one or other of the muscular layers. For the first time we are dealing with a concrete lesion. This ulcer may be acute or chronic. It may occur in a short period of time and be accompanied by severe symptoms of pain, vomiting and hæmatemesis, or its onset may be spread over so long a period that no definite date can be set for its beginning. Our experience in studying these ulcers is that if they do not heal after two or three months of strict medical treatment in bed, they then become chronic and probably will never heal of themselves.

These ulcers are practically always demonstrable upon the plate, and are not by any means always demonstrable on the screen. The *x*-ray evidence depends upon the demonstration of a crater large or small with an incisura opposite. The crater when constant is diagnostic. The incisura alone is not, although it is helpful confirmatory evidence. Demonstration of the actual lesion is, however, insisted upon and we do not place reliance upon the "symptom complex" method by which the presence of an ulcer is inferred from the behaviour of the stomach as seen on the screen.

Plate I. is a good typical example, and contains all the essential information for the diagnosis.

4. *Perforating Ulcer.* Here the process of extension has gone a step further, and the ulcer has now sloughed through all of the muscular layers, and is separated from the general peritoneal cavity only by the serous layers of the stomach or by a mass of adhesions walling it off. If sharply limited it forms the well-known accessory pocket, but this may be very large and diffuse. Such pockets may or may not empty with the emptying of the stomach. It has been our experience that as a general rule the incisura disappears with the penetration of the ulcer through the last layer of muscle, and I regard this as a very helpful, though not infallible guide in estimating the depth of an ulcer.

5. *Malignant Ulcer.* This is the degeneration of an ulcer into a cancerous process. For some years we have been taught that ulcer of the stomach tended to become malignant, whereas ulcer of the duodenum did not. This is too big a question to take up here, except to observe that if this were the case it seems certain that such a transition would be seen much more frequently than is actually the case in view of the thousands of examinations being made all over the country. When recognized even in its early stage, cancer is frankly cancer, and bears no resemblance to ulcer, while the number of cases in which ulcer has been demonstrated, passing over into cancer is small. However, it probably does occur, and should be included in any classification.

The study of a large series of gastric cases with their indefinite or even misleading clinical symptoms, in which the *x*-ray examination has been the means of providing definite information upon which an accurate diagnosis has been based, is after all the most convincing proof of the value of this method. The following cases are added as illustrations. In almost all of these the diagnosis was inconclusive or definitely wrong and the *x*-ray examination provided the essential information from which correct conclusions could be drawn.

Case No. II. Was referred for examination three years ago with a written diagnosis of chronic appendicitis. *X*-ray examination showed a deep incisura on the greater curvature, and on the lesser curvature opposite it a large flat area, which was inelastic, but no crater was present. Diagnosis: Gastric ulcer of the indurated type.

One year later I again examined this patient, and found an extension with crater formation as is shown in Plate No. III. Here we have, I believe, a demonstration of the development of a chronic gastric ulcer.

Case No. IV. Clinical Diagnosis: gastric carcinoma. *X*-ray diagnosis: Penetrating ulcer on the posterior wall near the lesser curvature with hour-glass contraction.

Surgical findings: Penetrating ulcer on posterior wall near the lesser curvature with hour-glass contraction. Sleeve resection. Pathological report: Non-malignant. Shortly after this the patient had another attack, and was referred again for *x*-ray examination.

Plate No. V. shows the second finding diagnosed as another ulcer on the lesser curvature extending from the upper segment downwards and backwards.

Surgical findings: Ulcer extending from upper

segment, and having its base against the aorta. Gastroenterostomy done.

When the ulcer becomes a perforating one the incisura very frequently disappears as is illustrated by Plate No. VI. Here the ulcer was adherent to the pancreas, which probably prevented its further ex-extension.

Plate No. VII. Clinical Diagnosis: Duodenal ulcer.

X-ray Diagnosis: Duodenal ulcer plus penetrating gastric ulcer which has penetrated through all the muscular layers to the serous coat of the stomach.

Surgical Findings: Duodenal ulcer and deep penetrating ulcer. Gastroenterostomy.

Size of Crater. In connection with the discussion as to the significance of the size of the crater the general teaching has been that ulcers measuring 3-5 cm. across the crater are probably maglignant and Carman reports several such. The next two cases illustrate very large ulcers and several other cases in which the craters were of larger size than usual.

Case No. VIII. Clinical Diagnosis: Pyloric obstruction.

X-ray Diagnosis: Large penetrating ulcer with much induration on the lesser curvature.

Surgical Findings: Large ulcer on the lesser curvature. Gastroenterostomy done.

Pathological Report: Adeno-carcinoma.

Two months later the patient was again examined. The findings are shown in Plate No. IX. The ulcer has disappeared and there is no evidence of carcinoma.

Two months later than this another examination shows the condition to be unchanged. Plate No. X. Here we probably have a case which was not malignant.

Case No. XI. Clinical Diagnosis: Advanced carcinoma.

X-ray Diagnosis: Large perforating ulcer on lesser curvature with marked induration of gastric wall.

Surgical Findings: Perforating gastric ulcer—non-malignant. Other ulcers of large size are illustrated by plates No. XII and others not illustrated here. None of these were malignant on section.

Case No. XIII. Clinical Diagnosis: 1. Angina pectoris. 2. Gall stones.

X-ray Diagnosis: Penetrating gastric ulcer on the lesser curvature.

Surgical Diagnosis: Penetrating ulcer on the lesser curvature.

Case No. XIV was one of special interest from a radiographic standpoint in which the method weathered the storm of clinician, surgeon and pathologist.

Clinical Diagnosis: Perforated gastric ulcer.

Operated at once without *x*-ray.

Surgical Diagnosis: Perforated gastric ulcer which was repaired.

Pathological report. Non-malignant.

X-ray one week later: Extensive carcinoma of the stomach.

Autopsy: Extensive carcinoma of the stomach.

Case No. XV. Clinical Diagnosis: Gall bladder.

X-ray Report: Pyloric obstruction by an old ulcer of the duodenum with perforation and accessory pocket passing backwards and upwards along the great vessels to the under surface of the liver.

Surgical findings: Confirmed *X*-ray findings.

Case No. XVI. Clinical Diagnosis: Gastric ulcer.

X-ray diagnosis cicatricial stenosis of the lower end of the œsophagus.

Surgical findings: As above.

Case No. XVII. Clinical Diagnosis: Nervous indigestion for twenty years.

X-ray Diagnosis: Diverticulum of duodenum.

Surgical Diagnosis: Diverticulum of duodenum.

Case No. XVIII. Ditto.

Case No. XIX and XX. Pyloric stenosis as a result of older ulcer.

As a result of these and many other similar cases the position of the *x*-ray in diagnosis of gastric ulcer should be beyond doubt. Not only is the information definite, but it is extensive, and covers many aspects which cannot be ascertained in any other manner except by exploration. Even here the information has been more accurate than by exploration on several occasions.

In closing I wish to express my indebtedness to my colleague, Dr. W. H. Dickson, for material assistance, many of the quotations made being taken from his reports.

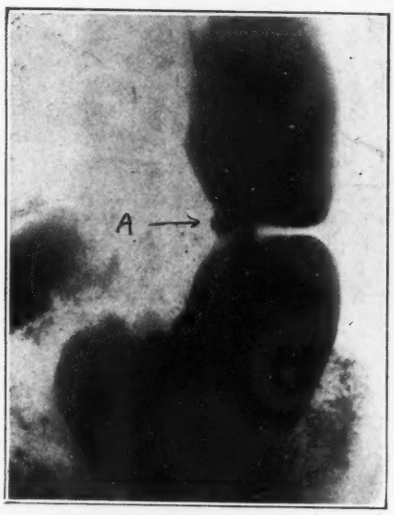

PLATE I.

PLATE II.

PLATE III.

PLATE IV.

PLATE VI.

PLATE V.

PLATE VII.

PLATE VIII.

PLATE IX.

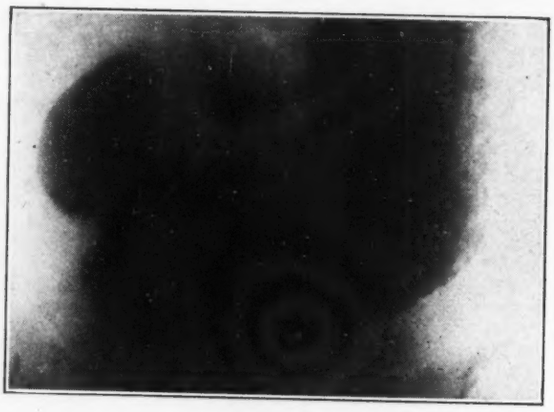

PLATE XI.

PLATE X.

PLATE XII.

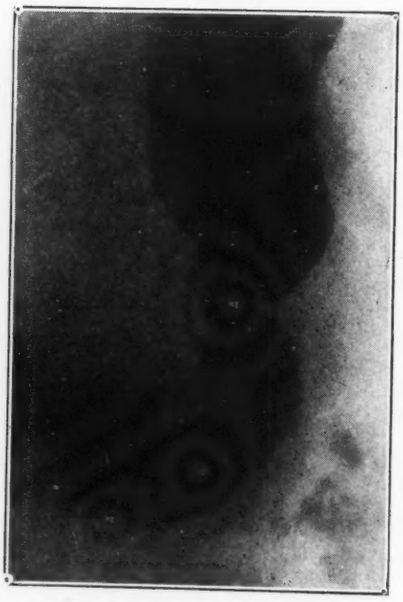

PLATE XIII.

PLATE XIV.

PLATE XV.

THE DIFFERENTIAL DIAGNOSIS OF APPENDICITIS

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THE abdomen is opened more frequently for the removal of a diseased appendix than for any other variety of visceral disease. Every surgeon therefore has abundant opportunity to study appendicitis in its varied forms. Sir Berkeley Moynihan, some years ago, called special attention to the value of the study of pathology in the living and, I suppose, there is no field in surgery which has given us more frequent opportunity for observation than the study of the diseased appendix in the living subject. We have had vast and accumulated experience to aid us in interpreting the signs and symptoms which exist before operation, in the light of the conditions found on opening the abdomen. Yet we must confess to-day that, at times, the diagnosis is extremely difficult and it therefore becomes an important subject for discussion. In the differential diagnosis of lesions of the right side of the abdomen we frequently have to deal with appendicitis both in its acute and chronic form.

A typical case of acute appendicitis presents a very characteristic clinical picture. The symptoms are familiar to us all, we have a history of abdominal pain, often epigastric at first and then localizing in the right iliac fossa, rigidity of the muscles in the lower right side of the abdomen, often exquisite tenderness on pressure over this region with a history of vomiting and occasionally diarrhœa. The temperature and pulse may be normal or there may be a slight rise of both. Blood examination will show a leucocytosis and the diagnosis, from a study of these symptoms is readily made. There is often a history of previous attacks to confirm our conclusions. It is true the symptoms which I have narrated may be induced by other conditions which have resulted in an inflammatory reaction in the right iliac fossa but, because of the great frequency of acute inflammatory conditions in the appendix, we will be right in our diagnosis in the vast majority of instances.

In a typical case, the diagnosis is not only difficult but often well nigh impossible even in the most serious types of the disease or in the hands of most skilful clinicians. Let me give an example:

A patient aet. 40 at the time of operation exhibited a perforated gangrenous appendix situated low down behind the bladder with general peritonitis and stinking pus in the pelvis. His illness had lasted seven days prior to operation and yet during that entire week his only symptoms were abdominal distress and difficulty in getting a free movement of the bowels. Throughout his preoperative illness there was no vomiting and no rise of pulse or temperature; the abdomen remained flaccid except a slight degree of rigidity over the upper part of both recti muscles. The only suggestive features in his history were a leucocyte count of 13,000 on the third day, together with pain at the point of the penis and frequency of micturition. The features of his post-operative history were vomiting and obstruction. He died four days after operation and at autopsy the pathologist found twelve inches of gangrenous small bowel in the pelvis, a collection of pus in the region of the spleen and a second collection in the mid line over the pancreas.

Those of us who have had extensive experience in operations for acute appendicitis have learned that most serious conditions may exist within the abdomen in the absence of the typical symptoms of the disease. A gangrenous appendix may exist without any rise of temperature or pulse, without any vomiting and without any perceptible rigidity of the abdominal muscles. The diagnosis of acute appendicitis in certain atypical cases is, at times, one of extreme difficulty, and demands the most careful sifting of clinical evidence in order that we may establish a correct diagnosis.

Let us now turn our attention to some of those aids to diagnosis which help us in reaching accurate conclusions. Anatomically we may consider that the most common position of the appendix is in the right iliac fossa; when it is situated there the diagnosis of acute appendicitis is comparatively easy. At times, however, the cæcum is pendulous and the appendix lies low in the pelvis. At other times, through failure in the descent of the cæcum or of complete rotation of the gut in development, or from both causes, the appendix may be high up in the middle line or in actual contact with the under surface of the liver, occasionally I have found it adherent to the gall-bladder and on one occasion it lay in the left iliac fossa. Under these conditions, when the appendix is far removed from its usual position the difficulties in diagnosis become greatly increased.

Subjective pain and pain induced by pressure upon the appendix in acute inflammation are valuable diagnostic signs. In that classic in medical literature by the late Mr. John Hilton, surgeon to Guy's Hospital,

Read before the Clinical Congress of the American College of Surgeons, in the discussion of the differential diagnosis of lesions of the right side of the abdomen, Montreal, October, 1920.

entitled, "The Therapeutic Influence of Rest and the Diagnostic Value of Pain," we have what has long been recognized as a most inspiring monograph full of valuable suggestions as to the interpretation of pain. You will recall his lucid demonstration of the associated nerve supply to a joint, the muscles controlling the joint and the skin over the muscles—so that when the joint is inflamed and painful, the muscles are contracted to act as a splint and the skin over the muscles is exquisitely sensitive. Hilton, who wrote sixty years ago, applies the same principle to the abdomen, tracing the associated nerve supply to the intestinal wall, the parietal peritoneum, the muscles of the abdominal wall and the skin over the muscles. To quote his exact words he says: "The muscular apparatus of the abdomen, its serous membrane, the skin over the muscles, and the intestines themselves, are thus brought into harmonious associations." He then refers to the signs of acute peritonitis with abdominal rigidity and pain. He also very shrewdly remarks that "perhaps the only exceptions are cases of the asthenic forms of peritonitis which depend upon the blood being poisoned, then the influence of the nervous system is as nothing and we should not expect to find this tense and tight condition of the abdominal parieties." To-day with all our increased knowledge of infection and its effects we have not got very far beyond the facts thus elucidated by John Hilton.

Since Hilton's day we have more exact knowledge of the anatomy of associated nerve supply and the experimental physiologist has given us valuable data as to the function of these nerves. Gaskell devoted his life mainly to the elucidation of the problems of the involuntary nervous system and in his monograph on the subject we have a clear demonstration of the anatomy and physiology of the nerves supplying the viscera. Then again we have the inspiring work of Sir James MacKenzie in his book on "Symptoms and their Interpretation". Pottenger has written a monograph on the "Symptoms of Visceral Disease" in which, mainly from the work of Gaskell and MacKenzie, he has further traced the clinical application of our present knowledge of nerve control of the viscera. From these various sources we may cull valuable information which will help us in understanding the true significance of symptoms and in establishing the diagnosis in visceral disease.

It is not the purpose of the writer to discuss individual conditions which may lead to error in the diagnosis of appendicitis. The argument would be too discursive were we to pass under review each affection in turn which may come into consideration in the diagnosis. A. J. Ochsner has given us a list of thirty maladies which may be confused with appendicitis and one might add to that list. For example, I might add one, which Ochsner has not mentioned, namely, the rupture of a dissecting aneurism. A patient was admitted to my wards at midnight with a history of sudden pain in the lower part of the abdomen on the right side, on admission a mass was found in the iliac fossa; this was opened by one of my assistants. It proved to be blood. Hæmorrhage was severe and the wound was packed to control it. The man died and at autopsy was found a dissecting aneurism of the aorta which had burst into the right iliac fossa. Of the more common conditions which are apt to confuse us in our diagnosis we have cholecystitis, renal or ureteral stone, Dietl's crisis in movable kidney, perinephritic abscess, duodenal and gastric ulcer, acute pancreatitis, acute inflammation of the uterine adnexæ in women, the pain which frequently exists in early typhoid or the perforation of an ulcer in late typhoid, perforation and abscess in malignant disease of the cæcum, inflammation of the right spermatic cord in acute epididymitis and the referred pain from a right sided pleurisy or pneumonia.

Each of these and possibly others must be considered and excluded in establishing a diagnosis of appendicitis. Occasionally we find it impossible to do so, our diagnosis may be inaccurate but in many instances there may be no doubt as to the necessity for operation. We must be prepared to deal with such conditions as are found otherwise the surgeon who opens the abdomen, and discovers other than he expects will court disaster.

While not attempting to discuss the differential diagnosis of each condition which may confuse us in our diagnosis we may briefly refer to the methods employed in reaching our conclusions.

Through the sympathetic nervous system we have to consider a complicated reflex mechanism which links up the intestinal canal with the central nervous system in the dorsal and upper lumbar portions of the spinal cord. Another path for the passage of reflex impulses exists in the bulbo-sacral connections of the intestinal canal established through the vagus with the medulla and through the pelvic nerve with the sacral region of the spinal cord. It is not necessary for our purpose to describe the complicated anatomical connections or, in any detail, the physiological activities conducted through these nerve paths but the practical application of our more minute knowledge of these matters may be summarized by stating that, by the reflex mechanism established with the spinal cord through the sympathetic nerves, we have an explanation of certain sensory motor and trophic phenomena in connection with those portions of the skin subcutaneous tissue and the muscles of the body surface, which are associated in their nerve supply with the particular portion of the intestine which we have under examination. Again through the vagus and the pelvic nerve we have the paths of reflex activities motor, sensory and secretory, which are responsible for reflex effects carried from one organ to another, e.g., disturbed gastric function in cases of appendicitis. It has been suggested that certain paths for reflex manifestations

exist through the vagus with the fifth nerve which clinically are expressed in headache, etc.

Regarding the vagus, this statement, in the light of our present knowledge, must not be taken as absolute. It might be more consistent to assume that the reflex effects carried from organ to organ may pass through either the vagus or the sympathetic, one or other or both may be responsible. Therefore with more strict accuracy we may use a term including both systems and assert that this reflex effect from organ to organ takes place through the "autonomic nervous system".

Our conception therefore of the explanation of the symptoms produced in appendicitis is based upon the nerve control and connections of the portion of the intestine in which the appendix is found. The abdominal viscera are connected through the sympathetic nervous system with the thoracic segments of the spinal cord from the fifth to the twelfth and possibly the first and second lumbar segments. The appendix is regarded as connected with the twelfth dorsal and first lumbar. Hence from the associated nerve supply of muscles and skin we have an explanation of the distribution of muscular rigidity and of cutaneous hyperalgesia.

The muscles which may show reflex motor effects would be the external oblique, internal oblique, transversalis, lower part of rectus, the psoas and the costal part of the diaphragm. We therefore have an explanation of the familiar phenomena of rigidity in the abdominal wall, producing a splinting effect of the lower abdomen on the right side when the underlying appendix is acutely inflamed. Occasionally we observe a tonic contraction of the psoas and a partial fixity of the diaphragm with impaired expansion of the right side of the chest.

The skin presents a condition of hypersensitiveness over a definite area. This is apparent at McBurney's point, and would appear to be a true viscero-sensory reflex. Just as Hilton demonstrated the superficial sensitiveness of the skin over an inflamed joint and traced its explanation to an association in nerve supply, so here the superficial sensitiveness of the skin is effected through a nerve reflex. Mr. Ligat has recorded certain observations on the diagnostic value of maximal points of hyperæsthesia of the skin and subcutaneous tissues of the abdominal wall in affections of the abdominal viscera. His method of demonstrating the phenomenon is by grasping the skin and subcutaneous tissues firmly between the finger and thumb and drawing them away from the deeper layers of the abdominal wall. If hyperalgesia be present the patient winces, and shows his distress by his facial expression. Ligat has mapped out certain limited areas on the abdominal wall in which he established hyperalgesia for other abdominal organs in addition to the appendix. These areas are described by him as follows:

1. That for the gall-bladder is situated where a horizontal line drawn from the tip of the tenth rib crosses a vertical line drawn midway between the nipple line and the middle line of the abdomen.

2. The maximum appendix point is situated at the junction of the upper and middle thirds of a line drawn from the umbilicus to the right anterior superior spine. The fallopian tube point of hyperæsthesia is at the junction of the lowest and adjacent fourths of a line drawn from the middle of Poupart's ligament to the umbilicus. In gastric or duodenal ulcer he locates the maximum point exactly midway between the ensiform process and the umbilicus.

3. That of the small intestine, excluding the first part of the duodenum, is situated in the midline of the abdomen, not higher than a point at the junction of the lower and middle thirds of a line drawn from the ensiform to the umbilicus, or lower than a point at the junction of the upper and middle third of a line drawn from the umbilicus to the symphysis.

In regard to the large gut the maximum point is located centrally in the lower half of a line from the umbilicus to the symphysis.

Ligat's contentions regarding these viscero-sensory reflexes are sound in theory and are based on scientific fact. In practice, however, one finds that one cannot always demonstrate the existence of hyperalgesia. The sign in fact, although it can at times undoubtedly be demonstrated in a very striking fashion, is often absent. The same remark applies to rigidity in the muscles. We may conclude that both these signs are of value when we find them present but their absence does not exclude the existence of visceral disease.

I may also remind you that another area of hyperalgesia may be found to the right of the twelfth dorsal spine: this is accounted for by the fact that here, from the same spinal segment we have the cutaneous distribution of the posterior primary division of the spinal nerves from the same segment of the spinal cord as that associated with the nerve supply to the appendix.

Here let me emphasize the importance of recognizing the fact that pain is produced by direct pressure over an acutely inflamed appendix. It may be true as Mackenzie and others contend that pain is not experienced until the inflammatory process has passed beyond the appendix proper and has invaded the serosa, nevertheless we have here a most important diagnostic sign which must always be borne in mind. Pressure over the acutely inflamed appendix will always produce pain. Hence the importance of a digital rectal examination which will clear up the diagnosis in many a doubtful case, if the appendix is situated in the pelvis. Similarly pain will be elicited on pressure in the loin in a retrocæcal appendix or in the right hypochondriac region if it is lying high up under the liver or again if it is situated, as is the case in rare instances, in the left iliac fossa.

When the inflamed appendix is situated in the pelvis one is likely to encounter bladder complications by implication of that viscus, producing frequency of micturition and referred pain.

We may now briefly refer to the reflex effects produced through the vagus upon other organs. The most common example is that of gastric symptoms with secretory reflex effects. Gastralgia and disturbed gastric function are common. Similarly vomiting and diarrhœa may be attributed to the same cause. So too symptoms referred to the gall-bladder are often encountered and we know how frequently both cholecystitis and appendicitis co-exist in the same patient.

We may in conclusion refer to the conditions which obtain when general peritonitis results with or without gross perforation; here we have a more extensive implication of abdominal reflexes with the characteristic general rigidity of the muscles of the abdominal wall accompanied by vomiting and intestinal obstruction.

I have not referred to the value of blood examinations including not only a leucocyte count but a differential count of the blood elements. This is recognized to be of great importance and often is a determining factor in reaching a diagnosis.

Toxæmia undoubtedly modifies the symptoms to a marked degree, by paralyzing the nerve centres. This is particularly the case with regard to the reflexes through the sympathetic nervous system. In the presence of profound toxæmia these reflexes may be completely in abeyance with entire absence of rigidity, etc., at the same time vagus impulses are no longer active and we have the resultant tympanites and obstruction.

Then too, apart from toxæmia it is possible that, in some instances, the gangrenous condition of the appendix, including as it does death of the nerve elements in the wall of that viscus, may destroy the reflex arc at its inception with results similar to that of toxæmia.

I have not covered this subject in an exhaustive fashion but I have endeavoured to suggest certain lines along which, in the light of our present knowledge, we are able to utilize methods of investigation which will be of material assistance in arriving at a differential diagnosis.

SOME UNUSUAL ABDOMINAL EMERGENCIES

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IN 1912 I read a paper before the Huron Medical Society dealing with the *usual* acute abdominal emergencies, which it is not my intention to repeat at this time, but rather to bring to your attention some unusual abdominal conditions met with.

The first case to which I will refer illustrates to a very marked extent the referred pain met with in some cases of chronic gastric ulceration. The patient, an Englishman, of forty-two years of age, was admitted to a medical division of the Toronto General Hospital with a diagnosis of "angina pectoris". The very typical pain constituted his main symptom, while the complaint of indigestion, i.e., slight abdominal discomfort, belching of gas, and occasional vomiting—occupied such a minor place in his thoughts as to be only brought out by close questioning. The *x*-ray revealed a large ulcer on the lesser curvature of the stomach and he was transferred to my service where a posterior gastro-enterostomy was done, giving complete relief. The ulcer was glued to the under surface of the left lobe of the liver.

Little attention has been paid to those cases of chronic gastric ulcer with adhesions to, and at times excavation of, the liver, where the referred pain in the chest, shoulder, or back, seems to be as characteristic as certain conditions of the liver causing referred pain in the right shoulder.

Mackenzie[1] has observed, in rare cases, symptoms resembling attacks of angina pectoris which he concluded were due to violent peristalsis of the cardiac end of the stomach. The course of the referred pain he took to be up the vagus nerve and down the cervical nerves.

The origin of this referred pain is, however, still obscure. In uncomplicated cases of chronic gastric ulcer a burning ache extends a variable distance up the front of the chest into the neck; this, in the simplest form we term "heartburn." The path of the reflex here seems to be the vagus.

In cases complicated by adhesions to the liver and perhaps excavation of the liver substance, the character of the pain is more traceable to the path of the phrenic nerve and the cervical plexus. So, it would seem, the pain in some cases is due to involvement of the nervous supply of the stomach, while in others it is due to involvement of the nervous supply of the peritoneum covering the liver, the adhesions causing a dragging or a stretching of this structure.

A case (2) which recently came under my care for the relief of an hour-glass stomach presented this referred agonizing pain in the shoulder and back, and as the ulcer involved almost the entire circumference of the upper third of the stomach and was glued to the under surface of the left lobe of the liver with a large excavation of its substance, the cause of the pain may have been either an involvement of the vagus or the phrenic or a combination of the two. The stomach could not be separated from the liver in this case and to relieve the obstruction a gastro-gastrostomy was done. The referred pain was not improved by the relief of the obstruction but was controlled, though not entirely, by medication directed to the surface of the ulcer.

An unusually acute case (3) of pyloric obstruction in a Russian of twenty-eight years of age was admitted to the medical division of the Toronto General Hospital in April last. Here it was thought that he was suffering from an acute appendix, gall bladder or gastric ulcer, and he was transferred to my service for operation. It should be added that the difficulty of diagnosis was increased by his not speaking English. He was suffering intensely with pain in the epigastrium, vomiting repeatedly large quantities of dark brown fluid, in spite of the fact that none had been taken by mouth, and with a visible peristaltic wave passing from left to right across the epigastrium about every two minutes. It was now clearly pyloric obstruction, and as the vomiting did not relieve him, one of my assistants decided upon operation. Gastric lavage was not done. At operation the stomach was found enormously distended and the walls thickened with obstruction at the pylorus. A posterior gastro-enterostomy was performed, giving complete relief. The severity of his symptoms was out of all proportion to what one would expect to find in a case of pyloric obstruction which had been gradually developing during four years. A subnormal temperature and the vomiting of large quantities of dark brown fluid—as much as eighty ounces in four hours, none of which had been taken by mouth—suggested an obstruction lower down in the intestinal tract. The origin of this fluid reveals a most interesting fact, viz., that an abnormally distended stomach, completely obstructed at the pylorus, preventing any regurgitation from the duodenum, with œdematous and congested walls, is

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capable of secreting fluids at the rate of an ounce in three minutes. When such an outpouring of the fluids of the body can occur from the stomach alone, one can readily understand the gravity and extent of obstructive lesions lower down in the intestinal tract, and an explanation for the grave symptoms which occur secondarily to the depletion of the body fluids.

Although the exact nature of an acute lesion within the abdomen is frequently in doubt, the diagnosis of peritonitis is seldom made in the absence of some active pathological lesion. Occasionally referred pain simulates an intra-abdominal condition, as a recent case (4) of a girl of eleven who was admitted into my service at the Toronto General Hospital, and was seen by one of my assistants, illustrates. She had been ill for three days with severe attacks of vomiting and abdominal pain and distention. On admission she was complaining of severe abdominal pain and tenderness and had very extreme abdominal distention. She was restless, with anxious facies, and the slightest touch of her abdomen caused her to scream out. Temperature 103^0, pulse 120, respiration 30. The diagnosis of general peritonitis, probably a ruptured appendix with general blood infection, was made and the abdomen was opened, with a negative result so far as finding any pathological lesion. Blood culture revealed a short chain *streptococcus* infection. Her abdominal symptoms were so prominent that they overshadowed the minor symptoms of a general blood infection, resulting in the diagnosis of peritonitis. The patient died the following day and at post mortem no focus of infection was found, although the tonsils were suspected. The case is interesting as showing that one may have symptoms of a general peritonitis in a septicæmia without there being any intra-abdominal lesion.

No. 5 is a unique case of infection with a gas bacillus. Mrs. M., age thirty-six, domestic, white, was admitted on May 7th into my service at Toronto General Hospital; she was always a strong, healthy woman, with four children, youngest eighteen months. Menses two weeks previously, normal. Four days ago had slight hæmorrhage from vagina and some cramplike pains across lower abdomen. She consulted a doctor who gave her morphia. The following day her temperture was 103^0 and she was slightly jaundiced. On the morning of 5th of May, she had a slight chill, followed by a headache and severe cramplike pains across lower abdomen, and passed about twelve ounces of blood from vagina. She was sent into the hospital suffering, supposedly, with peritonitis, for operation. She had the complexion of a dark mulatto; conjunctivæ tinged yellow; she was delirious and very restless, with dry lips and dry coated tongue. The abdomen was greatly distended, no movement on respiration, tympanitic in front and dull in the flanks, liver dullness diminished. Temperature 105^0, pulse 120, white blood corpuscles 56,000. A blood culture was taken and it gave a positive culture of the bacillus ærogenes capsulatus type No. 2, i.e., the bacillus welchi, such as was met with in cases of gas gangrene at the front. The spectroscopic examination of the blood and urine showed sulph-hæmoglobin. The urine was black tarry in appearance, looking like coffee grounds with red blood cells and albumen. The patient rapidly got worse and died in the afternoon. Autopsy report, usual findings of severe toxæmia. The endometrium was greyish, necrotic looking and showed microscopic areas of round celled infiltration extending into the uterine muscle. A postive culture of the Welch bacillus was obtained from all organs. One c.c. of broth culture was injected intraperitoneally into a guinea pig and the pig died in ten hours and the same bacillus was obtained from the pig. Focus of infection, uterus.

No. 6, acute cholecystitis and cholelithiasis, Mrs. G., age forty-two, admitted with a history of having been taken two days previously with severe pain in the abdomen, settling down under the right costal margin, with nausea and vomiting. Temperature then was $101\ 2\text{–}5^0$. On admission pulse 100, white blood corpuscles 12,000. A mass could be felt extending down from the ninth costal cartilage towards the umbilicus. It felt the size of one's fist, was rounded and very tender. Usual gall bladder incision made and on opening the abdomen the great omentum was found adherent to the anterior wall and wrapped around the cystic duct, completely walling it off from the general abdominal cavity. The omentum was stripped from the fundus of the bladder, which was found to be greatly enlarged, intensely inflamed and with gangrenous areas that were almost at the point of rupture. Stones could be felt within the gall bladder. It was decided to remove it en masse. Accordingly it was separated from the under surface of the liver and the gall bladder tied off, it and the artery being transfixed and ligated en masse. A quarter inch rubber tube was attached to the stump and two large cigarette drains inserted down to the cystic duct, lying against the side of liver from which the gall bladder was removed. There was very little shock, cigarette drains removed on the second day, all drainage removed on the eleventh day. There was a slight discharge until the fifteenth day, patient up on the eighteenth and left the hospital on the twenty-first, making a perfectly satisfactory recovery.

No. 7 is an unusually interesting case. Mr. A. T. R., age sixty, was taken one evening with a very severe gastric hæmorrhage, which caused him to collapse. A few hours later he was so exsanguinated that a transfusion of blood was performed upon him during the night. He made a nice recovery from this and three weeks later, after a transfusion of blood, the abdomen was opened and a large mass felt at the pyloric end of the stomach. A pylorectomy was done with posterior gastro-enterostomy. The tumour at the time was presumed to be malignant, but microscopic section shows it to be a fibroma.

Case No. 8. Mrs. S., age fifty-four, was admitted into the Wellesley Hospital under my care with the history of good health until two days before, when she was taken with severe pain in the abdomen, with a temperature of 103^0 and a pulse of 120. On examination a well localized mass could be made out on the left side of her abdomen, which was tender to touch, and dull on percussion. She had a leukocyte count of 11,000. My diagnosis was either carcinoma of the descending colon with perforation and abscess, or acute diverticulitis with abscess. An incision proved the former diagnosis to be the correct one, and after evacuating the pus I resected the tumour and eight inches of the descending colon, making an anastomosis between the transverse colon and the sigmoid. The pathological report showed an early adenocarcinoma which had developed in the base of an ulcer of the bowel, and most of the mass was of an inflammatory character. There was no glandular involvement. The patient made a good recovery and is now (eight months after operation) in her usual good health.

Case No. 9. Mr. W., age sixty-eight, had been ailing for a week before he entered the hospital. He had severe vomiting, complete obstruction and a large tumour above the umbilicus. Although the case was practically hopeless, I made an incision under gas anæsthesia, and it disclosed a tumour consisting of the entire omentum, which was gangrenous, and which had come through a hernia in the umbilicus. The gangrenous mass was removed, but the patient succumbed shortly after.

Case No. 10. Mrs. S., age sixty-four, two weeks after a severe attack of erysipelas of the scalp and face was suddenly taken with pain and ridigity beginning in the right iliac fossa, but soon spreading over lower abdomen. A diagnosis of acute appendicitis was made and the abdomen opened. A certain amount of peritonitis was found, with an inflamed appendix, but in addition a rounded soft tumour, size of a grape fruit, attached by a small pedicle to the small intestine near the cæcum. This tumour was evidently growing from the intestine, for in removing it a portion of the intestinal wall was removed with it, leaving a perforation. Dr. Lougheed, the pathologist, reports as follows: "*Frozen sections:* Shows muscle tissue with inflammatory reaction throughout, areas show necrosis and breaking down, tissue shows gram positive coccus with marked round celled polymorph and plasma celled infiltration. *Infected myoma of bowel.*"

Lastly, I should like just to refer to acute diverticulitis as one of the somewhat unusual types of abdominal emergencies. Acute diverticulitis occurs most commonly in connection with the sigmoid, less frequently with the descending colon and rectum. It is usually mistaken for a left sided appendicitis. I operated upon a physician, age fifty-eight, six years ago for this condition and drained an abscess, the perforation of the diverticulum being at the brim of the pelvis. He made a good recovery but developed a fistula, which eventually closed, but opens from time to time.

Dr. Masson recently read a paper before the Ontario Medical Association in which he reported nearly two hundred cases as having occurred at the Mayo Clinic. These cases were mostly chronic ones. If perforation does not occur, acute diverticulitis will form a mass which simulates a malignant growth. I have had several cases of this kind. It is possible now, with the *x*-ray, to diagnose diverticulitis without difficulty.

Reference:

1. Mackenzie, Sir James.—"Symptoms and their Interpretation," 1909, page 131.

NOTES ON DRAINAGE IN SURGERY

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THE selection of such a common place subject for presentation perhaps needs some justification. One finds that interns often have very widely differing ideas as regard to drainage, and as a man is when an intern so he will be after leaving the hospital. In general, interns would keep drainage in too long. In my own time as a resident, tubes were left in much longer than they are now, and after the tubes were removed the patients were daily tortured by re-inserting packing for fear the wound would close too soon and thus entrap some pus. The too general a continuation of the custom probably still exists. This is the justification for the choice of the topic.

In this brief note we will not discuss the problem of when to drain and when not, but merely what materials to use and how long to leave the drain in.

When a drain is inserted into the tissues it causes irritation. Irritation causes the formation of fibrous tissue, which mats together tissues not intended to be firmly attached to one another. New formed fibrous tissue contracts and thus causes a crippling of the part whether it be a hand or a belly. Moreover, fibrous tissue, unless at perfect rest, will not absorb. Therefore, the crippling of the part will be permanent and the gloomy part of it is that it tends to get worse. The sequence is, foreign body, drainage, irritation, adhesions, fibrous tissue, contractions, interference with function, gradually gets worse. Thus it is evident that the problem of drainage is one of no little importance.

Purpose. It may seem scarcely worth while to speak of a matter that is so perfectly self-evident as the purpose of drainage. To clear the ground for discussion, however, it is probably wise to raise the point.

The purpose is to drain out some physiological or pathological liquid or semi-liquid material, which, if retained in the body, would prove detrimental. This liquid may be very watery in its consistency or it may be quite thick. On the fluidity of the discharge depends somewhat the kind of drainage.

To show that it is not a pathological fluid *per se* that is to be drained off, one has only to mention extravasated urine. In itself it is not pathological. But we will speak only of drainage of pus.

It may be postulated that pus under tension is the dangerous thing, not merely the presence of pus. An appendix filled to the point of great tension often gives nearly as much temperature and other untoward urgent symptoms as a whole bucketful of pus free in the belly. A chest full of pus only needs to have the tension taken off to produce a marked and rapid change for the better without in any way, for the time being, making the absorbing area any smaller. The tiny pus cavity at the root of a tooth is known to be the cause of all too much trouble. Why so? Because it is so located that it is under considerable tension.

Granted that pus under tension is the *bête noire*, not merely the presence of pus, the essential thing in the operation is not to get all the pus out, but to provide a good exit for it. The one time custom, not yet dead enough, of diligently curetting off the inside of the wall of an abscess should be stoutly condemned. The all too common and deadly operation of curetting the lining of a septic womb has been the cause of many an untimely demise. The late John B. Murphy was wise to the point when he said, regarding general peritonitis, "Get in quick and get out quicker." He quit traumatising the belly cavity by trying to get out all the pus, he merely provided a hole to relieve the tension of the pus and he reduced the death rate from 95 per cent. to 5 per cent.

Drainage should be efficient, i.e., should give easy exit to the pus. To this end (1) It should usually be in the most dependent part. (2) Usually one opening is sufficient if the pus is in a distinct cavity. (3) It should not damage the tissues. (4) It should be kept in as short a time as possible. (5) In exposed parts drainage should cause as little permanent disfigurement as possible.

The materials used for drainage may be enumerated as follows, glass tubes, rubber tubes, rubber tissue, gauze, silk-worm gut, cat gut and silk. Glass tubes were formerly used extensively in abdominal cases. Methinks many fæcal fistulæ of twenty years ago were directly traceable to the glass drainage tube. Why? Because first, the tube was too hard and too resistant to the nearby coils of bowel, and second, the tubes were left in too long. Glass tubes are not much in favour to-day except in the occasional case where a primary fæcal fistulæ is made. There a Paul's tube is occasionally used.

Rubber tubes are much to be preferred in comparison with glass tubes. The damage caused by pressure from rubber tubes whether it be on viscus, muscle, vessel or nerve should be almost negligible

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provided it is not left in too long. The definition of "too long" will be discussed later.

Rubber tissue used in various ways alone, or enclosing gauze, allows a thin liquid to drain out fairly well but prevents the exit of thick discharges. It fulfills one function of drainage very well, viz: that of preventing union of the superficial tissues before a pus sinus has been established.

Gauze drainage is about as efficient as is rubber tissue and not more so. The meshes of gauze are soon filled with the thicker part of the discharge and so it is soon reduced to being a mere plug to keep the superficial tissues from uniting prematurely. Gauze soaked in vaseline is much to be preferred to plain gauze in many cases. The living tissues enter the meshes of the plain gauze and in twenty-four hours the foreign body may be literally "grown" into the tissues. The removal of the drain will do actual damage to the tissues as well as give the patient undue pain.

It is well to mention here the distinction between drainage and packing for gauze is sometimes of great use as packing and nothing else can well take its place. By packing is meant the filling of a cavity. This is most frequently done to stop oozing or free bleeding. A bone cyst which has been curetted out may need to be packed with punch and mallet. In a case of inevitable abortion gauze packing placed about the cervix can scarcely be bettered. An operative surface that continues to ooze is benefitted much by spreading out gauze packing. The gauze should not be vaselined for its open meshes encourage coagulation. Packing is not drainage.

For the drainage of small, superficial cavities a bundle of strands of silk-worm gut does very nicely. Its use is rather limited however, being chiefly of advantage where the discharge is very liquid, such as an outpouring of serum or slight oozing of blood.

Cat gut should be mentioned only to be condemned. It so soon becomes soft it really is an excellent culture medium. Any site where it could be used silk-worm gut can just as well be used. The latter is firm and does not encourage the growth of organisms. Cat gut should not be used at all as drainage. Silk is more desirable than cat gut but not to be preferred to silk-worm gut.

The rubber tube is the usual drainage material used to-day. It will be just as well to say just a word further about it. It is variously made ready to admit the pus into it from the cavity to be drained. One is frequently surprised at being handed a tube with holes cut in its sides from one end to the other. The slightest knowledge of physics will make it clear that one cannot syphon water if one uses a rubber tube with holes in it throughout its length. And so one cannot hope to get pus out of a pelvis through a tube with holes more superficial than the level of the pus.

Of course if a tube, which is square on the end, goes to the bottom of the pus cavity the discharge may not find its way into the tube. The simple method of splitting the tube, for perhaps an inch, will give ready entrance of the discharges.

Special Points. Where a viscus has been opened and again repaired any drainage inserted should be carefully placed a little distance away from the line of suture. The mere contact with the line of suture encourages leaking and may very readily be the undoing of an otherwise good operation.

In general it may be said that in abdominal cases it is well to drain through the operative incision. For a retrocæcal abscess due to an appendix, a drain in the loin is advisable. In the case of the pelvis, however, it is rarely necessary or wise to drain a pus cavity through the vault of the vagina if the operation has been done by the abdominal route. The less advantageous drain through the abdominal wound answers the purpose very well.

How long should the drain be left in the abdomen? It is undoubtedly only forty-eight hours at the most till the tube is draining merely the sinus in which it lies. That is the time to remove it. Should the mouth of the sinus have gauze put in? If so, why? I see no reason why it should and believe it should not be done. The drainage of a gall bladder is done for a special reason and the tube may well be left in longer. The same may be said of a suprapubic cystotomy.

In the case of the chest there is an entirely different problem to that met with than in most places. Elsewhere the cavity quickly ceases to be a cavity by the closing in of its walls. Not so the pleural cavity. Its outside wall is rigid and cannot collapse. The inside wall, the lung, is all too slow in expanding and so the cavity is slow to close. The skin will heal over before the cavity is obliterated and, therefore, before drainage is complete. This is one of the few places where a pus sinus will close before its work is completed. Therefore, the same must be kept open by keeping in a tube.

Drainage in the tissues of the extremities, except where pus is beneath a muscle, is best carried out by gauze, or gutta-percha tissue. If there is oozing of blood from the incision, moist gauze may be used to promote coagulation and thus stay the bleeding. Otherwise gauze soaked in vaseline, or gutta-percha tissue is best used, such drain being more readily removed without causing undue pain. In any case the drain should be removed in twenty-four or not later than forty-eight hours at the most. The purpose of the insertion of any drainage material in the extremities is largely that of preventing union of the skin until a pus sinus has been established. Where the pus has to pass beneath a muscle a rubber tube will be necessary, otherwise the muscle will cause enough obstruction to the exit of the pus to cause it to collect under pressure.

When the tube can be dispensed with it is preferable to do so. Its pressure on the tissues is greater than that of gauze and damage to a certain extent will occur.

THE PRACTICAL VALUE OF A METABOLISM CLINIC

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THE study of metabolism in clinical medicine is essentially a consideration of nutrition,—the constituents and uses of foods, their oxidation in the body and their elimination.

One seeks to know the chemical and vital changes that occur in the body, and what effect food-stuffs have on the structures and functions of cells and viscera. Energy production is the result, and the total metabolism is expressed in terms of heat (calories).

Clinical medicine takes up the subject where physiology left it, endeavouring to find the limits of the normal,—the limits within which variations in function are insignificant, or where dangerous.

Basal metabolism expresses the minimal heat production measured on the fasting stomach and during repose.

Among the most important studies in this subject is the chemistry of the proteins estimated chiefly by the waste products in the urine, that of fats and carbohydrates on the other hand being expressed in terms of the respiratory quotient.

It is a remarkable fact that while the care of the digestive system is of prime importance to health, yet no system is relatively more ignored in practice.

We habitually talk of the diabetic diet, of the obesity diet, of nephritic diets, and of the typhoid diet, as though foods were administered by rule equally for all cases. As a matter of fact, the food values are determined for each individual case in ever-changing proportions, for on this basis alone can rational feeding be administered.

Diets should be prescribed as are drugs, watched from time to time in the course of disease, and changed in detail according to their need.

Fortunately for human beings, the human machine is so evenly balanced that in the healthy body only the grossest digressions cause obvious harm. Nevertheless, the ordinary dietetic errors of everyday life inevitably induce functional changes, which, if persistent, create serious pathological lesions.

Let us take, for example, the protein foods of everyday life which are normally dismembered in the intestines and hydrolyzed to non-poisonous amino-acids. If these proteins be imperfectly split in the intestines, bodily poisons may be developed and even reach the blood, in which case they might be excreted by the kidney, and the kidneys easily suffer.

It is in just such cases as these, then, that a simple modification of the diet would not only cure such a disturbed function, but protect the kidneys from increasing disturbance.

What is obviously needed is more education in respect of food-stuffs,—education of the physician, of the nurse, and of the patient.

It is surely most important that a nurse should know that stewed and boiled meats are better than fried ones, and why this is the case,—that there are methods of making foods digestible, inexpensive, and simple, that under certain conditions water is needed in abundance, and that at other times it should be restricted.

As a matter of fact, there has been far too much empiricism, and not enough scientific study in the matter of dietetics in practice, and it is not without reason that someone has said, "In the course of years perhaps the food of the sick man may be as scientifically administered as that for animals on a modern farm."

Nor is it any less curious that we do not as yet know what must be regarded as essential food-stuffs. The theory has obtained until quite recent times that all the food-stuffs essential to life were expressed in the broad groups, proteins, carbo-hydrates and fats. To-day, however, we have come to learn that there are other essential ingredients, without which the functions of the body cannot be carried on for any length of time, viz. the essential amino-acids and the vitamins.

Some years ago Eijkman discovered that beri-beri was induced by the taking of rice without its pericarp, and that the addition of this portion of the food removed the symptoms. Very small quantities of these vitamins, indeed, are essential to health, and vital to growth, but their influence upon secretions and metabolism generally is apparently all-important.

In the same way, epinephrim is essential to life, even though it exists in the very minute proportions of 1 to 100,000,000 in the blood.

Food values, then, are not all-important in the limited sense hitherto commonly employed. It has moreover been amply shown that all proteins are not of equal food value, some being defective in the essential amino-acids, while others are not utilizable by the human body. For example, the protein of mushrooms never leaves the intestinal tract, while that of gelatine is not utilized by the body, but can only spare body nitrogen. Efficiency depends upon the power for repair, and this in turn directly upon the

quality and quantity of food. Analogous examples of the importance of food values are found in the so-called deficiency diseases (scurvy, rickets, pellagra, beri-beri).

Not the least interesting of these studies concerns the effects of various proteins in asthma, hay fever, skin lesions and epilepsy. I. C. Walker, among others, has found that in the wide distribution of proteins throughout Nature, there are many to which people are sensitive, or anaphylactic. These proteins,—pollen, food, and bacterial,—may at times enter the digestive or respiratory tracts, and light up the manifestations of disease. Food proteins he found to be a frequent ætiological factor in asthma, his patients being variously sensitive to egg protein, or cereal grains (wheat), milk, etc., and not uncommonly sensitive to many at the same time, especially in youth.

These tests for sensitiveness are readily made on the skin, producing, when applied intracutaneously in Na hydroxide solution, reactions of an ephemeral urticarial character. The treatment of the disease consists in desensitization if possible; otherwise avoidance of the respective protein involved.

Application in Diseases of Kidney. The importance of proteins as a factor in disease is best shown in diseases of the kidney, and nowhere more strikingly demonstrated than by the recent work of Newburgh, who in a series of experimental cases induced definite renal lesions by the adminstration of high protein diets, over relatively short periods of time.

Metabolic studies have contributed immensely to our knowledge of nephritis, its detailed diagnosis, its prognosis and its treatment, and have pre-eminently taught us to regard function in the kidney as of greater importance than anatomical structure.

This question of function moreover is an interesting feature of prognosis. Thus, for example, to know how the renal tissues deal with urea and the N end-products in general, how the salts are excreted, to what extent other end-products of metabolism are removed,—this is a matter of chemical analysis, and the information thus obtained in the laboratory not only adds to our knowledge of the type of disturbance and its prognosis, but contributes in no small measure to our methods of treatment, medicinal and dietetic.

Renal Diagnosis. We have already stated that metabolic studies have done much to advance the problems of functional diagnosis. In other days it was our custom to describe samples of urine as normal or abnormal according to their constituents. To-day we know that there is no such thing as a "normal urine". It is well to consider the urine as the end product of an attempt on the part of the body to keep the blood normal. As everyone knows, the presence of albumen and casts, and the tests for urea now in vogue in ordinary practice, give very little accurate information of renal disease or function. Nevertheless, tradition dies hard, and these tests still remain the methods of election.

The function of the kidney is essentially to excrete the waste products of metabolism, to preserve normal concentration of body fluids, thereby maintaining normal chemical reactions in the body. In other words, it concerns response to changes in circulation, and the power of the kidney to adapt itself to ever-changing conditions.

Functional Tests. As a matter of fact, no single test is suitable for a complete estimate of kidney function. In association with the history and physical examination, a series of tests gives one much more light, and these tests repeated at intervals show the improvement or retardation in the function of the kidney. From their findings the proper dietetic control can be instituted.

The Phthalein test, it may be urged, is *per se,* a sufficient guide for renal diagnosis but while this is in some respects true for surgical conditions, it does not hold in the various forms of nephritis. A normal phthalein excretion may be present when there is a serious lesion and vice versa, with comparatively little renal disease, the excretion may be very much diminished. Frequently an abnormally high night rate of excretion, over 80 per cent. in 2 hours is present, which shows hyperactivity.

Wherever possible it is obviously more satisfactory to employ the following *Group of tests* as being of the greatest use in determining kidney function.

1. The Phthalein Test to determine approximately total function.

2. The Nephritic Test meal (Mosenthal). This determines the relative volumes of day and night urines, the elasticity of the kidney as demonstrated by the specific gravity range and the power to concentrate N at night.

3. The determination of renal concentration of urea one and two hours after taking 15 grms. of urea by mouth. This recent test has been advocated with much satisfaction by Hugh MacLean of England.

4. The Ambard co-efficient: The study of the rate of urea and chloride excretion in relation to their concentration in the blood.

5. Or one may do as W. R. Campbell suggests and use the simpler water tests and dry diet, determining the general functional powers of the kidney for excretion and concentration.

In any event the essentials are to estimate the concentrating power and to determine in part where the lesion exists.

Characteristic pictures are thus obtained of normal kidney function, of signs of disease in cardiac kidneys, of acute and chronic nephritis. Also one is able to differentiate the pseudo-nephritis of anæmia from a true nephritis.

Treatment. Where N retention exists a low

protein diet is of prime importance, favouring as it does urea excretion; nevertheless, a limit exists to this treatment inasmuch as an insufficient protein diet causes withdrawal of protein from the body tissues, in order that sufficient metabolism may go on to maintain life.

One feature in the treatment of N retention is here worthy of note, viz., the encouragement of diuresis. Increased water intake favours N excretion and to that extent the older idea of flushing out the kidney bears some weight. The indiscriminate application of this principle, is, however, to be condemned, for with hypertension excess of fluids adds to the blood volume thereby increasing the pressure and adding to the danger.

Salt Retention and Nephritic Œdema. The metabolism of salt in nephritis is not well understood. We know that it is closely associated with the development of œdema. Normally, if the chlorides in the plasma fall below the concentration of 5·62 g.p.l. no salt is present in the urine. That is the reason why the chlorides disappear from the urine in pneumonia, only to return with the crisis.

In nephritis when there is difficulty in the elimination of chlorides the threshold is usually raised often to 6·00 g.p.l. or higher. By restricting the salt intake, the threshold will tend to drop towards the normal level, the excess at the same time passing out of the blood stream.

In many cases of so-called chronic parenchymatous nephritis, or nephrosis, associated with extensive œdema, the chlorides are frequently retained in the tissues, there actually being a very low plasma chloride. In these cases it is often difficult to hasten the return of the chlorides into the blood stream so that they can be eliminated with a corresponding diuresis.

Investigations with results of treatment are best exemplified by the subjoined tables—illustrating the course of improvement under properly controlled therapy.

CASE 1.—ACUTE NEPHRITIS. Male, Age 30. Weight, 76 kilos.

Date	Volume Night Urine	Concentration of Nitrogen at night	Blood Urea	Rate Urea Excretion McLean's Index.	Chloride Threshold grams per litre.	Phthalein 2 hours	Remarks
Normal	400 c.c.	1·0%	0·4	80–150	5·62	65–75	
March 9th, 1917 (Adm.)	720	0·30%	0·54	15	6·00	30	Œdema of legs. Hæmaturia.
April 3rd, 1917	645	0·68%	0·36	83	5·71	72	Albumin—4 gms. per litre. Casts.
May 16th, 1917 (Discharge)	400	1·03	0·25	135	5·67	81	Alb. a trace. No hæmaturia.

Blood Pressure: Systolic 130: Diastolic 70.

Diet Date	Diet	Salt	Fluids. c.c.
3–6–17	Restricted Protein.	Salt free	1500
3–14–17	Protein, 52; fat 73; CHO 118.	Salt free	1500
3–20–17	Protein, 64; fat 86; CHO 187.	Salt free	1500
4–11–17	Protein, 80; fat 90; CHO 250.	Salt free	1500

CASE II.—CHRONIC NEPHRITIS Male, Age 55. Weight, 66 kilos.

December 3rd, 1916 (Adm.)	620	0·38	1·53	5·2	6·38	trace	Œdema of lower limbs Albumin 8 gm. per litre. Abumen—trace.
June 22nd, 1917	500	0·60	0·585	23·5	5·67	57	
February 10th, 1919	490	0·92	0·39	38·	5·61	58	
July 3rd, 1920	460	0·89	0·51	58·	5·77	60	

Blood Pressure.

Date	Systolic	Diastolic
Dec., 1916	140	100
June, 1917	126	80
Feb., 1919	130	80
July, 1920	120	80

Diet:

Date	Diet	Salt	Fluids c.c.
Dec., 1916	Low protein	Salt-free	1000
June, 1917	Restricted protein.	Salt-free.	2000
Feb., 1919	Restricted protein.	Salt-restricted.	1500
July, 1920	Restricted protein.	Salt-restricted.	1500

Diabetes: Statistics. 164 cases have been treated to date, a series which has enabled one to form conclusions on this disease when treated with all possible scientific care. Through Allan's studies the disease itself is better understood. Cases are now detected much earlier, and thereby dietetic treatment is instituted more quickly and with immensely greater benefit. The duration of life is much longer and mortality is lessened. Cases are often quite arrested, if not cured.

Finally, complications are more easily avoided and treated, and surgical conditions that arise are handled with more intelligence and with better results.

This is perhaps most striking in the case of adults, many of whom have lived for more than fifteen years in good health. Moreover, in children whose mortality hitherto has been lamentably high, and with whom in former years the diabetic life was reckoned in months, it is now prolonged into years.

One of our cases has lived to three and a half years in tolerably good health. Indeed, for children this newer method of treatment gives to it the semblance of a new disease, such conditions not having existed before.

The routine method at present usually adopted for all diabetics (without urgent acidosis) on admission, is as follows:

1. Observation diet is given. (1·5 gr. protein p. kilo. body weight. 1 gr. CHO p. kilo and with fat enough to make 20-25 calories p. kilo.)
2. One-half observation diet is given.
3. Fasting till sugar free (except for chicken broth and three times boiled vegetables and bran cakes).
4. Determination of CHO tolerance upon green vegetables, increasing 10 g. CHO daily till glycosuria two days in succession on same CHO intake.
5. Fast till free from glycosuria (rarely more than one day needed).
6. One-third trial maintenance diet (1–2 days).
7. Two-thirds trial maintenance diet (1–2 days).
8. Trial maintenance diet, containing 1·5 g. protein p. kilo, one-half CHO tolerance as determined under 4. Fat enough to make 20-25 calories p. kilo.
9. Changes above 8, p.r.n.

To this preliminary treatment is added the progressive care till exit, and includes education of patient in special dietetics and caloric values, training in urinalysis and some cooking.

Acidosis. Where acidosis exists, metabolic studies enable one to deal with diabetes more intelligently and to treat the disease with far greater success

Newer methods have contributed not only in accurate knowledge, but have enabled us to judge of prognosis and thus avoid much of the anxiety incident to cases where our ignorance previously had left us in doubt.

The results most successful in treating cases with acidosis may be summarized as follows:

1. Rest in bed.
2. Free catharsis.
3. Forcing of fluids up to 5000 c.c. daily.
4. Fasting.
5. Careful observation of the degree of acidosis by the simple method of van Slyke. (CO_2 volumes per cent. concentration in blood.)

Under unfavourable progress, the fast is broken by small quantities of protein (egg-white), and if necessary sodium bicarb. is administered orally, per rectum, and, as a last resort, intravenously. Preliminary gastric lavage early if vomiting occurs.)

In one instance 103 g. sod. bicarb. was given by mouth, etc., resulted in raising CO_2 volume per cent. from 19-31, thus bringing the patient from the verge of coma to safety.

Hyperglycæmia. Added interest has arisen through more careful study of the sugar content of the blood, and much has been contributed to our knowledge of differential diagnosis, and not a little to therapeutics thereby. Hyperglycæmia and lowered sugar tolerance are factors of importance in many diseases.

Sciatica, for example, in many cases is definitely associated with and probably caused by defective carbo-hydrate metabolism. There may be no sugar in the urine, but the concentration in the blood may be abnormally high. For example, in one of our cases with persistent sciatica, the fasting blood sugar was ·113 per cent., and was raised after 100 g. of glucose to ·274 per cent., and the patient voided ·9 g. of sugar. Dietetic treatment rapidly relieved the condition.

In many cases of glycosuria associated with *syphilis,* hyperglycæmia is found, and the sugar tolerance is reduced to normal by approrpriate treatment. In one of our cases the tolerance was raised from 60 g. of carbo-hydrate to 135 g. in ten months.

A very remarkable series of cases has recently been described in which the hyperglycæmia of *chronic arthritis* (·326 per cent.) has been relieved and the disease even cured by dietetic course which aims to relieve lessened tolerance for carbo-hydrates, when the focus of infection has been relieved.

The procedure now in many of these cases of chronic arthritis is to remove focal infections when present, and at the same time treat the patients largely as one would in cases of diabetes, endeavouring to raise the tolerance for carbo-hydrates.

Our methods, then, have changed, and protein diets are allowed, where formerly they were condemned. In one of our patients with chronic arthritis deformans, a focal infection in the teeth and the bladder were relieved, the fasting blood-sugar was ·144 and raised after 100 g. of glucose to ·308. He voided 7·57 g. of sugar, and yet under appropriate treatment the condition was much relieved.

In all forms of glycosuria, whether diabetic or

otherwise, the most important feature of the treatment is to free the urine from sugar by dietary measures.

These are but a few of many fields of usefulness for chemical investigation. The paths are open in all directions and yield fruitful results.

Basal Metabolism, at present, has a limited clinical application in medicine, more especially in observation of endocrine function, chiefly in thyroid disturbances, where its results aid in diagnosis, prognosis, and in consideration of surgical possibilities. In fact, it is the only accurate means of control in comparison with other tests at our disposal.

And so, the answer is given to those who recognize in metabolic studies naught but scientific amusement, or a pastime of research without practical results.

The metabolism clinic is in its infancy, and every modern medical service is tending more and more to have as its chief feature the chemical and physical study of patients as a *sine qua non* for diagnosis and treatment.

THERAPEUTICS

Some New Concepts in Digitalis Therapy. EGGLESTON, C.: *Amer. Jour. Med. Scien.*, 1920, Vol. CLX, p. 625.

THE author first reviews the recent advances in the clinical pharmacology of the drug. The effect of digitalis on the heart rate is most noticeable in the fibrillators, but there is also a definite slowing, though not so marked, in those with normal rhythm. In the latter group vagus stimulation is responsible for a large part of the slowing, but there is also some increase in the conduction time. In auricular fibrillation the slowing results from a partial A-V block, with an elimination of the weaker auricular impulses, but the drug has little effect on the auricular rate. Digitalis also has a direct action on the myocardium. This is evidenced by the alteration of the T wave and there is every reason to suppose that the ventricular extrasystoles produced by digitalis arise from a direct action of the drug on the heart muscle. These facts represent our present knowledge of the direct action of digitalis on the heart. The effects on the blood pressure are variable, but the tendency is for the pressure to be altered in the direction of normal, with an increase in the pulse pressure (difference between systolic and diastolic). High blood pressure is not of itself a contraindication to digitalis therapy. So also in angina pectoris, there is no evidence that digitalis increases the spasm of the coronary arteries, and in many cases it may do good. Finally digitalis exerts a diuretic action only in the presence of œdema arising from a failing circulation; it has no direct action on the kidneys.

Digitalis is indicated in every case of cardiac failure, no matter what the cause. The dosage is identical and should be to the point of a minor intoxication with the drug. Nausea and vomiting are the most important of these signs, and their appearance should be a signal for a sharp reduction in the dosage. The drug may be administered in small doses (m.xx-xl of the tincture four times daily) when four to six days are required for the digitalization of the patient, or in larger dosage, when one to two days only are demanded for the saturation of the individual. In these cases a drachm of the tincture is given every six hours for four doses, then a half-drachm every four hours during the day and none at night. The latter dosage should be maintained until full digitalization is secured. The drug is then discontinued or its rate of administration greatly reduced. Eggleston emphasizes the necessity of constant supervision during the use of these large doses. The preparation selected should always be one which has been assayed biologically, and proved to be of high activity. The dried leaves and the tincture are the most stable and the most easily administered. Proprietary specialties are not superior to a high-grade official preparation, and their cost is often exorbitant.

Digitalis is rapidly absorbed after oral administration, but is excreted relatively slowly, and its action on the heart may persist for periods of two weeks or longer after the drug has been stopped.—D. S. LEWIS

THE PRESENT-DAY CONCEPTION OF HAY FEVER*

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IT is hardly necessary to define the term "hay fever" since the disease is so common that everyone is quite familiar with the symptom-complex with which this term is associated. Nevertheless, there are so many other conditions in which this group of symptoms is predominant that it may be wise to restrict the term to those cases in which the ætiological factor is the pollen of one or more plants. Barker[1] defines the disease as "a more or less severe inflammation of the mucous membranes of the nose, throat and bronchi, occurring in susceptible persons in the spring or in the autumn and caused by the inhalation of pollens of certain plants."

Historical. It was not until 1873 that Blackley[2] as a result of careful researches, called attention to the periodicity of the disease, and definitely established the relationship existing between the attacks and the presence of certain pollens in the air at these periods. In 1905 Dunbar[3] confirmed Blackley's observations and extended them. He introduced the method of treatment by the use of pollen, but believed that his extract of pollen was a true toxin which, upon inoculation into horses would call forth the production of antitoxin. This immune serum he called Pollantin, and used it in an attempt to produce a passive immunity in the patient. The results have not been sufficiently favourable to warrant the adoption of the method.

Since then, many investigators have devoted long and careful study to this disease and *active* prophylactic immunization by means of pollen extracts has definitely been established as the best method of treatment at our command.

Protein Sensitization. In individuals who manifest a hypersusceptibility to a protein, the administration of such protein, either hypodermically or intravenously, gives rise to a more or less violent reaction which may manifest itself by symptoms of profound shock, an attack of asthma, or the symptom-complex of hay fever. Sometimes these symptoms may be brought on by the mere ingestion of the offending protein, or by its absorption through the mucous membranes of the nasal passages and bronchi. It has long been held by many observers that these phenomena are of the nature of anaphylaxis. More recently, observations on drug hypersusceptibility in which there is no protein element, have cast some doubt upon the adequacy of this explanation. The writer had occasion to test a patient (a physician) in Walker's clinic, complaining of asthma and eczema, in whom the attacks were brought on while administering arsphenamine. Cutaneous tests with a solution of this drug yielded a result comparable in every way to those obtained in cases sensitive to proteins. Quinine has also been found to produce a similar result in suitable cases. Coca[4] urges that the term anaphylaxis be restricted to instances where the result is shown to be due to an antigen-antibody reaction, and claims that a true case of anaphylaxis in a human being has never yet been reported. He suggests the term "allergy" to cover all instances in which there is no proof of an antigen-antibody reaction. The term is by no means a new one but his suggested restriction of its use is new. A full discussion of this question is not within the scope of the present paper and it will be necessary to content ourselves with the statement that while the majority of investigators still favour the anaphylaxis theory to explain the phenomena of hay fever and bronchial asthma, there are serious objections which will have to be satisfactorily dealt with before the question is finally settled.

The table on following page taken from Walker[5], is an excellent means of visualizing the various causes of hay fever and their relationships to each other. The non-sensitive cases are nearly always due to bacterial infection and should not properly be called hay fever. These cases are characterized by a more tenacious type of secretion rather than the typical thin, watery discharge of true hay fever. Moreover, the eyes are less commonly affected and the whole picture more closely resembles an ordinary coryza, or common "cold". It is not difficult to conceive of such a phenomenon occurring during certain seasons of the year,—particularly in the autumn and winter. It may also be present more or less continuously throughout the year. Cases of so-called spasmodic vasomotor rhinitis occurring as a result of the presence of abnormalities of the nasal passages and sinuses are comparatively uncommon, and as Barker suggests, "the physician should protect the hay fever patient from the useless nasal operations of over-zealous surgical enthusiasts!" There are, nevertheless, certain cases presenting symptoms *simulating* non-seasonal hay fever, which are relieved after the removal of polyps or other gross abnormalities.

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Seasonal Sensitive Cases. During April and May the various trees pollinate,—each variety requiring approximately two weeks or less to complete the process. Therefore if an individual is sensitive to willow, for example, the attack will last only a very short time and specific treatment will not be worth while. If, however, the patient is sensitive to a number of pollens which are shed at different times, the attack may last for a considerable period, and prophylactic inoculation may be advisable. Such cases are comparatively rare.

The next pollen season begins in early June and lasts until the later part of July. During this time the grasses shed their pollens. It is true that other pollens are also met with in this period, for example, that of the rose and of the daisy, but these seldom cause hay fever, in spite of the popular belief as evidenced by the familiar terms "rose cold" or "rose fever". The chief cause of the disease during this season is the pollen of timothy, with that of June grass and red top ranking next. The term "hay fever" in its narrow sense should really be restricted to the cases occurring during this period,—since it is only at this time that the pollens of grasses used in making hay are the causative agents.

The third and most important pollen season begins in this country about the twentieth of August,—often a few days earlier. It lasts until the first heavy frost, which usually occurs the first week in October. During this season the chief offender is the pollen of ragweed. Occasionally golden-rod and daisy are found to be causal agents. It is true that very often in testing the patients for sensitiveness all three pollens are found to yield a positive result, but almost invariably that of ragweed causes by far the strongest reaction, with golden-rod a poor second and daisy faintly positive. Since these plants are related, such findings are believed by most competent observers to be an example of "group reaction," so familiar to bacteriologists. If this interpretation is the correct one, the reactions caused by golden-rod and daisy are in the majority of instances to be disregarded.

There are a certain number of sensitive cases in which pollens are shown not to be the cause even though the disease occurs in certain seasons only. Such individuals will react to one or more of the proteins of foods, animal dandruff, hair or feathers, or bacteria. With respect to the last mentioned, attention should be drawn to the point made by Walker, that bacteria may cause symptoms simulating hay fever in two ways; (1) by a sensitiveness to the bacterial proteins (2) by virtue of the infection by the micro-organism. The latter element was considered earlier in this paper, in referring to the non-sensitive cases. In all these instances, the seasonal incidence would have to be accounted for by a seasonal exposure to the particular protein concerned. This is readily understood in the case of certain foods and animals, and in the case of bacteria it would seem that infection somewhere in the body at stated seasons of the year would have to precede the appearance of hay fever symptoms due to a susceptibility to the protein of the organism present. An example of a seasonal hay fever caused by a food protein is described in the paragraphs discussing methods of diagnosis.

Where the proteins of animal hair, foods, and bacteria are the causal agents of hay fever symptoms, the disease is *usually* non-seasonal in type. The total number of cases caused by these proteins is comparatively small, as for some unknown reason the symptoms produced by susceptibility to these substances are nearly always asthmatic in nature. Hay fever symptoms are fairly frequently found, however, in persons riding horses or fondling pets, such as cats and dogs. Zinsser[6] cites the case of a laboratory attendant who always was seized with violent sneezing attacks, with running of the eyes and nose whenever he handled guinea-pigs in the course of his work.

CLASSIFICATION OF HAY FEVER (WALKER)

Sensitive Cases		Non-sensitive Cases	
Seasonal	All the year	Seasonal	All the year
1. tree protein	1. animal hair protein	1. bacterial infection	1. bacterial infection
2. grass protein	2. bacterial protein		2. abnormalities of nasal passages and sinuses
3. compositæ protein	3. food protein		
4. animal hair protein			
5. bacterial protein			
6. food protein			

Symptoms. In those who are affected with hay fever, the disease makes its appearance every year at aproximately the same time. It begins as an irritation of the nasal and conjunctival mucous membranes, with itching and sneezing as prominent symptoms. In a very short time, the eyes begin to water profusely, and there is a thin watery discharge from the nose. A cough is sometimes present, and in certain cases, asthma develops sooner or later in the season. There is often marked mental depression, with inability to concentrate the mind. General malaise, headaches and insomnia are sometimes marked symptoms, and in severe cases the disease is of the most distressing

character. During the attack the nasal and pharyngeal mucous membrane is rendered so irritable that dust or smoke will serve to aggravate the condition produced by the protein to which the patient is sensitive. The symptoms persist until the end of the period of pollination of the particular plant or plants concerned. As pointed out before, the season for the trees is quite short, but the grasses begin early in June and last until late in July. The ragweed season begins about the middle of August and ends with the first heavy frost. Not a few patients are sensitive to both grasses and ragweed. In such cases there is little respite from June to October.

Methods of Diagnosis. The methods employed in the accurate diagnosis of the disease rest on the basis of the observations of Dunbar[7] and others, that in sensitive subjects, the mere placing of the offending pollen upon the slightly abraded skin will cause a local reaction as evidenced by the appearance of a wheal and a surrounding area of erythema. The actual technique as now employed is as follows: a series of very slight scratches with a sharp scalpel are made on the ventral surface of the forearm. These scratches or cuts should not be deep enough to draw blood, and not longer than an eighth of an inch. They should be placed about one inch apart. The one nearest the elbow is left untouched as a control. A small amount of a suspected pollen is placed on the first abrasion, and dissolved by adding a drop of N-100 sodium hydroxide. The next scratch is treated similarly with another pollen, and so on down the arm until all the pollens which might reasonably be expected to be capable of causing symptoms at that season of the year, have been applied. In the average case one notices, within a few minutes, a red areola appearing around the abrasions treated with the offending pollens. In the centre of this areola, about the scratch, a wheal will be observed which gradually increases in size. The test is considered complete after thirty minutes, but it is usually unnecessary to allow the solutions to act longer than fifteen minutes.

Some observers prefer to inject solutions of the pollen protein intradermally instead of performing the cutaneous test as outlined above, but there are valid objections to this method. Chief among these is the fact that it is often difficult to differentiate a slight positive reaction from a negative one, as the injection of any solution into the skin necessarily gives rise to a wheal of certain proportions, due merely to the bulk of the fluid. Other objections will be considered in taking up the technique of estimating dosage in treatment.

While the diagnosis of hay fever may usually be made from the symptoms complained of by the patient, there is likely to be, nevertheless, quite an appreciable percentage of error if more accurate methods are not employed. Cases complaining of symptoms simulating seasonal hay fever may present themselves, and the diagnosis seem to be so obvious that sensitization tests appear superfluous. Such a case was tested by the writer in the clinic of Dr. I. Chandler Walker at the Peter Bent Brigham Hospital in Boston, and is cited by the latter in his recent paper[8]. This case, a housewife, complained of sneezing, watery secretions from eyes and nose, and general symptoms of coryza during the summer only. The history of her case did not differ materially from that usually obtained from patients sensitive to both the grasses and ragweed. Tests with the pollens, however, were entirely negative, and in subsequent routine tests with animal and food proteins, she was found to be sensitive to the proteins of wheat. We were at a loss to explain the periodicity of her trouble on this basis until she volunteered the information that every summer she takes a position as baker in a summer hotel. Apparently the ingestion throughout the winter of wheat bread and other foods containing wheat flour is not sufficient to produce symptoms, but that added to the amount of wheat protein breathed into the nostrils during the mixing of pastry, etc., pushed her over the threshold.

Treatment. Specific protein treatment. The most successful method of treating hay fever has proven to be the prophylactic inoculation of the patient with the specific protein causing the disease. Solutions of the pollen protein are made, grading the dilutions of the protein from 1-500 to 1-20,000 or higher. A preliminary test with the various dilutions is made by placing a drop of the solution on a scratch on the skin, having as many scratches as there are dilutions of the pollen. The initial dose (hypodermic) of the pollen will be 0·1 c.c. of the dilution next higher than the last one giving a positive skin test. Suppose 1-5000 gives a faintly positive test; the schedule of treatments would then be 1-10·000 give 0·1 c.c., 1-5000 give 0·1 c.c., 0·2 c.c., 0·1 c.c., 1-1000 give 0·1 c.c., 0·2 c.c., 1-500 give 0·1 c.c., 0·2 c.c., 0·3 c.c., 0·4 c.c., 1-100 give 0·1 c.c. and 0·2 c.c. (Walker).

Some workers use the intradermal injection of the various dilutions to determine both the diagnosis and the degree of sensitiveness. Not only does this method produce a slight wheal from the injection itself, but even comparatively inert substances may produce effects which are only with difficulty differentiated from a slightly positive test. For this reason this method is not to be depended upon to determine the initial dose to be administered in the process of desensitization, whereas the cutaneous method lends itself admirably for this purpose.

The treatments should be given one week apart, and should be completed by the time the season begins. *Therefore the course of inoculations should begin three months before the attack is expected.* Such a course of treatment should protect the patient for that season, and the schedule will have to be repeated each year,—at least for a few years.

In cases sensitive to animal hair, a similar routine is

carried out over quite a long period until the skin test shows the patient to be no longer sensitive to strong solutions of the protein. The most satisfactory method of treating food cases is simply to omit such food from the diet. Abstinence for a year or more often results in an automatic desensitization of the patient, who may then add the food to the regular diet without ill effect.

Climate. For those who are able to do so, a sojourn during the hay fever season in one of the resorts which are free from the offending pollen will usually prove efficacious. Muskoka and the Georgian Bay are free from ragweed, although some golden-rod is found. Generally speaking, however, the autumn cases do well in these localities.

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THERAPEUTICS

Administration of Large Doses of Digitalis in Cardiac Diseases. Warfield, L. M.: *Wisc. Med. Jour.*, 1920, Vol. XIX, p. 235.

Warfield emphasizes the importance of an active preparation, the necessity of standardization, and the use of a sufficient dose to produce one or more of the minor signs of intoxication—nausea, vomiting, slowing of the pulse, partial block, coupled beats, etc. For safe therapeutic dosage the schemes of Eggleston and of Robinson should be combined, and the total dose be calculated on the basis of 0.1 c.c. of tincture per pound of body weight. To produce best results the dose should cause a slight nausea. The problem is to bring the patient to this stage at the earliest possible moment, and then to stop the drug. He advises an initial dose of from 10 to 20 c.c. of tincture. (In this dosage we scarcely agree.—Ed.) If this produces nausea the full dose has been given and the drug is stopped. If no symptoms are produced then half the initial dose is given after six hours, a quarter of the initial dose six hours later and a fourth quarter after another six hours, and so on, until digitalization has been secured. The drug is stopped whenever nausea appears.

He urges caution in the administration of large doses, both as regards previous digitalis therapy (within ten days), and also in cases of auricular flutter. The presence of flutter should be suspected when the pulse is below 100, is regular, and yet there are all the signs of decompensation. A maximum dose of 4 c.c. every four hours until effects are noted would be safer in such cases.

Small doses are useless in most cases. With the larger dosage effects should be present within ten to thirty-six hours. D. S. Lewis.

Elimination of Carbon Monoxide from the Blood After a Dangerous Degree of Asphyxiation, and a Therapy for accelerating the Elimination. Henderson, Y. and Haggard, H. W.: *Jour. Phar. and Exper. Therap.*, 1920, Vol. XVI, p. 11.

All trace of carbon monoxide gas disappears from the blood within a few hours after the removal of the patient to a fresh air supply, the CO being displaced by oxygen; and yet signs of functional derangement and structural degeneration may persist for months. These effects are the result of tissue asphyxia while the gas is still in the victim's blood. In dogs there is a vigorous hyperpnœa during the development of asphyxia, and thereafter, due to deficient oxygenation and other causes, there is a diminished production of CO_2. This results in a relative apnœa, so that for half-an-hour after animals are exposed to fresh air there is a marked depression of breathing. During this period the rate of carbon monoxide elimination is slow, and the condition of tissue asphyxia is continued although the body is surrounded by fresh air. They suggest that this period of continued asphyxia may be of great importance in producing the sequelæ of gas poisoning and should be shortened as much as possible.

Oxygen inhalation during this period has only a slight effect as it is not adequately inspired. Inhalation of CO_2 diluted with air has an immediate effect, it augments the breathing and doubles the rate of carbon monoxide elimination. The use of CO_2 diluted with oxygen gives even more rapid elimination of the carbon monoxide, the oxygen displaces the CO and functional restoration is correspondingly accelerated. They hope to carry this method on to a practical application. D. S. L.

TWO CASES OF PELLAGRA IN CANADA

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THE incidence of pellagra in temperate regions has become more and more evident as the disease has become familiar in such climates, and it seems likely that many unrecognized cases are being treated in Canada for other troubles, simply because the condition has never been drawn to the attention of the general practitioner. This has happened elsewhere, for example the first case in Massachusetts was observed in 1862[1], and from that time until 1910 the literature is a blank. Then Fitzgerald[1], Dean, Lee and McDonald each had a case, and since that time pellagra has become commonplace. In Canadian literature I can find only two examples, namely those reported by Rolph[2] and Pinault[3], one being discovered in New Brunswick, and the other in Ontario.

The first case, which I saw in consultation on April 27th, 1920, was admitted to the Sherbrooke Hospital in the service of Dr. George Hume and was diagnosed by him. The patient was a married woman age twenty-one, who had lived in England all her life until she came to Canada in August, 1919. She was confined in September of the same year of a normal child. Her occupation previous to coming to Canada was assistant in a grocery shop. She was always a small eater, but preferred a mixed diet, and never ate maize in any form. Her chief complaints were abdominal pain, diarrhœa, headache and sleeplessness. Her personal history was good with the exception of occasional attacks of diarrhœa, but these were never associated with skin lesions.

The present illness began in February, 1920 with weakness and headache; then pain after eating, indiggestion and diarrhœa. Vomiting was present once or twice early in the course of the disease. Later she had marked stomatitis with stripping of the epithelium, leaving raw surfaces particularly under the tongue. She also had a hot sensation in the mouth but taste remained unimpaired. Her appetite was poor, the diarrhœa was severe and accompanied with pain, and the stools contained pus and bloody mucus.

When first seen she was in a wretched condition, emaciated and pale, except where the skin was affected with the rash. This rash was symmetrical on the neck, hands, wrists, feet and ankles. She said it looked like sunburn at first, but by the time she reached the hospital the skin had become hard and was desquamating, leaving a pigmented surface, cracked and bleeding in places. The finger nails and toe nails were discoloured and loosened from the nail bed in part, as if they would soon fall off. The headache was marked, but there was no photophobia. The knee-jerks were gone on both sides, and the plantars were active. The abdominal reflexes were gone except at the left upper segment. The Wassermann was negative. Blood count, R.C. 3,500,000, Hgln. 50 per cent., W.B.C. 18,000, Diff. Ct. slight increase in polynuclears, otherwise normal. Blood pressure D. 65, S. 98. The patient was running a temperature of 101° to 104°, but on April 30th she passed a lot of pus by rectum and the temperature dropped to normal, and was never quite so high again. Through May and June it ran 100° to 101°, and on July 6th it finally reached normal and remained there. She very gradually improved on Goldberger's diet and arsenic, though she remained sleepless and very irritable. The rash faded and new nail growth replaced the old. The patient was discharged well on October 22nd.

I was called in to see the second patient on September 20th and treated her at the Sherbrooke Hospital until October 10th when she died. She was a married woman, age forty-two, who had not lived with her husband for several years. She had two children in good health and never had a miscarriage. She had always lived in Canada within a short distance of Sherbrooke, and was always employed in housework. Her appetite was never good, and for some years she thought that she could not eat eggs or fruit. Corn meal rarely entered into her dietary. For several years she had been troubled with headaches, indigestion and depression of spirits. For some months her mouth had been sore, with a red tongue and loss of taste. Early in the summer she thought she got sunburned, although her daughter who was equally exposed showed no signs. A symmetrical erythema developed on the arms, extending from the insertion of the deltoid to the wrist, and from the wrist to the finger tips, the same appearance was noticed on the back of the neck. The redness faded and the rash left a dark desquamating surface. She then developed abdominal tenderness, and painless diarrhœa, with blood and mucous in the stools. About September 1st she complained of dizzy spells, and felt as if she was drawn down to the floor. Weakness of the extremities developed chiefly on the left side, and finally she had to go to bed.

Examination showed an emaciated woman with listless expression and dull mentality. The most noticeable feature was the dark brownish staining

of the skin extending from the upper arm to wrist, desquamating and bleeding in the folds of the elbow and on the edge of the discolouration. Contrary to the patient's statement the rash extended far on to the inner side of the arm where it would be practically impossible for the sunburn to reach. Further ex-

Case. 2—Pigmentation about left elbow and neck.

amination revealed the same condition on the back of the neck, and smaller areas on the knees and ankles while the skin of the hands was very thick and wrinkled with a tendency to crack and bleed. The mouth presented a painful stomatitis with peeling of the mucous membrane under the tongue, and a few red ulcerated patches at the tip. The abdomen was tense and tender. There was a constant, slight, foul, discharge from the enlarged uterus; a diagnosis of cancer of the uterus having been made by another physician some months before. The thoracic viscera were normal, and no enlarged glands could be found on the body. The mental attitude was dull, gradually becoming worse, latterly excited, with delirium and restlessness requiring restraint, and finally followed by coma and death. The knee jerks were exaggerated with a sluggish plantar reflex on right, and Babinski on left. There was a left ankle clonus, and the abdominal reflexes were gone. There was a general weakness but no paralysis. The fundi were normal. Blood count, R.C. 2,800,000, Hgln. 45 per cent., W.B.C. 8,000. Differential count normal. Blood pressure D. 70, S. 95. The patient was put on Goldberger's diet, but it was evident from the first that the case was hopeless. After refusing food and becoming rather violent she lapsed into coma and died, October 10th.

Both of these cases were typical pellagrins. They had the cardinal symptoms of "bilateral erythema appearing rather suddenly on exposed surfaces of the body followed by desquamation; diarrhœa, stomatitis, changes in the reflexes, altered sensation and irritability, tremors and psychic abnormalities."[4] Though the second case was complicated with cancer this is not unknown, as in the case reported by R. C. Bryan.[5] I was also fortunate in being able to show both cases to Dr. Gooding of Barbadoes who has had an extensive experience of the disease, and who was able to corroborate the diagnosis.

It was self evident that before a rational treatment could be adopted we had to know the ætiology of the trouble, and we had several theories to consider. In our cases we could exclude the maize theory, and Sambon's theory of the biting fly (Simulium), so we adopted the view that pellagra was a food deficiency disease, and used Goldberger's diet with increased

Case. 2—Limit of pigmentation on upper arm.

rations in fresh eggs, milk and meat.

Enright[6] concludes that more factors than food deficiency are involved in the origin of the disease, but our present knowledge points to the conclusion that pellagra does not exist without a food deficiency of one kind or another.

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FOCAL INFECTION WITH SPECIAL REFERENCE TO MEDICAL INSPECTION OF SCHOOLS

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WHILE acting as medical school inspector during the past year in a country district in the province, the writer was impressed with the very great prevalence of defective teeth, and of abnormal nose and throat conditions, among the children attending the public schools. He felt that he would be of most use, not only in preventing disease, but also in improving the general health of the children, if he could induce their parents to have local abnormalities about their head corrected. He is now endeavouring to put in writing the reason for this belief.

While attending the post graduate vacation course in medicine in Edinburgh in 1908, our attention was drawn to the danger of a septic mouth being the cause of pernicious anæmia and of other impoverished blood conditions. And how often do we find obscure symptoms of ill health, both physical and mental, and obscure soreness in the tissues, joints, muscles and nerves, and even a beginning enlargement of the thyroid gland, in an individual with lessened resistance, give way to attention to the teeth, or other focus of infection. Dr. Charles K. P. Henry, of Montreal, writing on this subject, says, "It is accepted that local foci of infection, often small in extent, insignificant in appearance, and often without local symptoms, are the unsuspected causes of obscure symptoms of systemic disease, and may even lead to remote lesions which are frequently fatal."

Let us attempt to elucidate this new idea in pathology by answering some questions concerning it. And first, what are the more serious diseases, believed to have their origin in germs entering the system from these foci of infection? These are acute rheumatic fever (acute arthritis), endocarditis (the form that acute rheumatism takes in the child), chorea, chronic rheumatism (chronic arthritis or fibrositis), myocarditis, pericarditis, nephritis, acute and chronic, gastric and duodenal ulcer, appendicitis and cholecystitis.

Next, where are these foci of infection located that are blamed for causing such serious and intractable abnormal conditions of the body? They may be located anywhere in the body, but are usually in tissues communicating with a mucous or cutaneous surface. Infection of the teeth and jaws, with the development of dental pyorrhea, and alveolar abscess, infection of the faucial and nasopharyngeal tonsils, and accessory sinuses are the most common foci of infection. Other sites are the gall bladder, appendix and chronic infection of the genito-urinary tract, including salpingitis, vesiculitis seminalis, prostatitis, cystitis and pyelitis.

What gave rise to this theory, and how do we know that it is correct? A better understanding of bacteriological processes and of modes of infection led to the knowledge that the so-called infectious or contagious diseases were due to germs, and also to the elucidation of the carrier problem in disease, as well as to the theory we are at present discussing. Thus ever since Pasteur's germ theory of disease was accepted, some fifty-five years ago, there has been a tendency to look more and more to individuals as harbouring disease germs, rather than to think that we catch the germs primarily from our surroundings, however unsanitary those surroundings may be. The knowledge of focal infection, however, is more particularly due to the work of clinical observers, and bacteriologists working together in the wards and laboratories of the hospitals in Chicago. Frank Billings* and his associates carried on this work for some years, and with Rosenow's experiments on animals, they proved their theory conclusively. A fresh culture of the streptococci from a case of human appendicitis when injected into the vein of a lower animal, such as a rabbit, produced in a large percentage of cases, typical appendicitis; not only so but a similar culture taken from the tonsil in a case of tonsillitis believed to be the cause of the appendicitis in that individual, when similarly injected, also caused appendicitis. The same type of bacteria could be obtained from all the lesions. Similarly by using a culture of the streptococcus viridans taken from a case of endocarditis in man, they produced similar lesions in the endocardium of the dog. By such painstaking experiments many times repeated have they added much to this part of medical science.

The result of treatment—the eradication of the focus—also in many cases helps to prove that the focus and the systemic condition bear the relation of cause and effect.

How do the germs in the focus get to the various parts of the body? Principally through the blood, but also by the lymph channels, and at times by contiguity of tissue. An example of the vascular route: the

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* Many of the ideas in this paper are taken from Dr. Frank Billing's book entitled, "Focal Infection."

streptococcus rheumaticus that causes the rheumatic manifestation, whether that manifestation be an arthritis, a myositis, a neuritis, an affection of the heart structures, or a chorea, or an attack of erythema nodosum passes from the primary focus in the mouth through the blood vessels to the site for which it has an elective affinity. When the maxillary or cervical glands are enlarged, the ætiological primary focus being in the head somewhere, the bacteria have passed along the lymphatic route. In acute glandular fever from which many children suffer, the infecting micro-organism from the inflamed throat passes rapidly through the cervical lymph channels and glands with resulting bacteriæmia and fever. Although this disease apparently occurs in epidemic form, it is probably more liable to attack those children who have diseased throats.

When the incidence of abnormal dental and throat conditions is so great, why are not more individuals seriously diseased? No doubt more of the diseased conditions that we are called upon to treat, are due to focal infection than we are aware of. Perhaps occasionally some other physician finds the ætiological focus. Nevertheless, the fact of their very frequent presence compared with disease, does not necessarily disprove the theory. For, although probably ninety per cent. of us have a latent tuberculous focus, usually of the cervical, mediastinal or mesenteric lymph nodes, still comparatively few develop marked tuberculosis. Again, many more individuals have chronic gonococcal infection of the prostate gland, the seminal vesicles, or the fallopian tubes, than develop gonorrheal arthritis, or the other occasional systemic manifestations of this germ.

Then again this infection long continued or frequently repeated, may produce a certain amount of immunity, so that the individual carrying the focus is not inconvenienced perhaps, until exposure to cold, the exhaustion and debility due to physical and mental overwork, or old age, so lowers the resisting power, that bacteria entering the circulation from the focus of infection, are capable of producing acute and chronic systemic disease. We do well to keep in mind the lesson given us by Pasteur some forty years ago. To prove that fowls whose temperature is higher than that of man, are not normally susceptible to anthrax, he inoculated the animal with the specific germ after the fowl had been placed in cold water. The disease developed, but when the temperature again rose to normal, after the fowl was removed from the water, the symptoms of the disease rapidly disappeared. The exposure to cold and dampness then, merely allows the bacteria in the ever present focus of the rheumatic and in his blood to gain the ascendency over the lowered resistance of the individual. The pneumococcus from the mouth of the individual himself or from that of a carrier, that is the prominent actor in the terminal infection of old age, or of a chronic diabetic, is an illustration of the same idea.

How are we to diagnose the presence of a focus of infection? The focus of infection may or may not cause local discomfort. When a systemic disease occurs which present-day knowledge leads us to believe is due to a focal infection, we should try every means to locate the focus. A full medical history of the patient should be obtained. In making a full and complete physical examination the services of a specialist may be required to examine the nose and throat and probably other sites. In pyorrhœa and sinusitis the *x*-ray is necessary. To quote from Dr. Henry's article in the July, 1920, number of The Canadian Medical Association Journal, "The most dangerous varieties of dental sepsis are pulpless teeth and blind abscesses." These abscesses are pumped into the blood or lymphatics every time we chew food. "Their frequency is beyond dispute. At the Forsythe Dental Infirmary 40,000 abscessed teeth were found in 50,000 children examined. Langstroth found at the University of California Hospital sources of chronic infection in 84 per cent. of ulcer cases, in 66 per cent. of subacute arthritis, in 73 per cent. of chronic arthritis, and in 100 per cent. of gall-bladder cases. Thoma in his chronic medical cases found alveolar abscesses in 88 per cent." Almost any organ in the body may get infected from this source.

Still quoting Dr. Henry, "From the tonsils we often get remote arthritis, secondary adenitis, septicæmia, endocarditis, bone abscesses, and secondary anæmia. The tonsils showing the largest amount of infected material are often small, atrophic, with smooth red surfaces, and yet contain virulent pus, with the streptococcus hæmolyticus or viridans as pure cultures therein. So innocent do they appear on examination, that often they are dismissed as unlikely to cause trouble."

How difficult it sometimes is to find and treat the ætiological focus may be illustrated by the following case. A middle aged gentleman saw me in the summer of 1919 suffering from inflammation of the great toe, following repeated cold water bathing. His history showed that he had at times some not very well marked rheumatic symptoms, and that he had been having attacks of tonsillitis. Examination of his urine showed some albumen with casts. There was no cardiac hypertrophy and his blood pressure was rather low than high. His general condition was much below par. After consultation removal of his tonsils was recommended. It was not, however, until after he had been examined by medical men in two of the large medical centres on this continent, that a diseased wisdom tooth was found and extracted, and all of his infected tonsillar tissue removed. When the tooth was removed, the rheumatic symptoms got worse. After two days the pains and aches progressively improved. (With many bad teeth in an individual with lowered resistance, care must be taken not to

remove too many teeth at one time for fear of dangerous or even fatal poisoning of the system.) After the removal of the tooth and of every vestige of tonsillar tissue, he gained about twelve pounds* in weight and felt correspondingly better. Examination of his urine indicated a less severe type of nephritis. He remembers having had rheumatic symptoms for about fifteen years, and believes that his tonsils were affected for even a longer time.

What can be done in the way of treatment? The public, especially children, should be taught the necessity of cleansing the mouth, teeth and throat of all particles of food after eating, as a preventive of local infection, decay of teeth, and general disease. In children the tissues of the mouth and other sites of infection in the head are very susceptible to infection. If these are kept free of streptococci there will be less danger of rheumatism, chorea and endocarditis. When the teeth of the child are already decayed, either the temporary or the permanent teeth, they should be either filled or removed. The extraction of abscessed, and of all dead teeth, as a preventive measure, with light curettement of the infected bone appears to be advised by the ablest men. The following interesting case was recently reported to me by a friend, a dentist. A young professional lady musician with considerably enlarged cervical glands on both sides, was in such a condition physically and mentally, that she gave up her work. On consultation with her physician, the dentist suspected some crown and bridge work, and a radiograph confirmed his diagnosis. Three weeks after extraction and light curetment she was rapidly improving, and a month later was prepared to take up her work again. As Dr. Henry says, "uneasy lies the tooth that wears a crown."

Greatly enlarged tonsils and adenoids in the child should be removed so that the sinuses may be better drained, and be less likely to become diseased. Dr. Henry, quoted above, says that "after the correction of dental defects many tonsils regain their physiological function, and become a dam instead of a sieve for bacteria." However, when a tonsil is actively diseased complete removal appears to be the only safe procedure.

This province last year appointed medical school inspectors not only in the larger centres but also in the country districts, who have great opportunities for advising preventive work along this line. I understand that later, clinics will probably be provided for country districts, where extraction of teeth and the opinion and treatment by dentists and other specialists may be given free, a work resembling that at present being, I believe, successfully carried on at the expense of the Red Cross in the neighbouring province of Nova Scotia. This work is in accord with the spirit of the age which, in the words of Sir Auckland Geddes, is endeavouring "to secure equal opportunities of health (as well as education and advancement) to rich and poor, high and low."

*After this paper was written, the patient reported that he had gained twenty pounds in all.

SUTURE OF CIRCUMFLEX NERVE

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PARALYSIS of the deltoid muscle constitutes a severe disability. While it is true that the supraspinatus and the clavicular fibres of the pectoralis major acting in conjunction with the trapezius and the serratus magnus assume a compensatory action, this is at best incomplete. In certain cases the patient learns by a trick movement to throw the arm outward and upward from the chest wall and once the arm has passed above the axis of the pectoralis major to use this muscle in thus holding it.

Bunts[1] in a carefully prepared article full of interest has reviewed the history of nerve injury about the shoulder joint: Galen, we learn, refers in his *Officini Medici* to Erasistratus who in 300 B.C. made mention of this complication in luxations of the shoulder.

In civil life injury to the circumflex nerve is usually subcutaneous, a sequel to dislocations of the shoulder, falls on the shoulder or more rarely to the use of a crutch. It has been described in miners whose manner of work necessitates prolonged lying on the side.

In the war isolated injuries of the nerve were very seldom met with. Benisty[2] writing on this point says: "As in several hundreds of cases of peripheral nerve lesions we have never come across isolated paralysis of the circumflex nerve such cases must be rare." I have been able to find but few cases reported and a prolonged search through the literature, including the Index Medicus, has thus far failed to discover a case in which the nerve has been sutured.

REPORT OF CASE

Private M., age twenty, was wounded on August 8th, 1918, by an exploding bomb, several small fragments of which entered his left shoulder and neck. Immediately after the injury the patient lost the power of movement in his left arm, with extensive sensory impairment, ascribed to a lesion of the brachial plexus. His wounds healed promptly without surgical intervention. Under appropriate massage and electrical treatment the paralysis and anæsthesia markedly improved and by the time of his admission to the Granville Canadian Special Hospital, Buxton, England, on November 7th, 1918, he had regained the use of all the muscles of his arm with the exception of the deltoid. The notes on admission state that there was no evidence of fracture nor of vessel injury but there was marked atrophy of the deltoid and he was quite unable to abduct the arm.

Lt.-Col. F. H. Mackay, who was in charge of the medical division, made a careful examination on November 16th and reported as follows:

"*Deltoid.* No response to faradism; slight response to galvanism: reacts to 1·0 microfarads, condenser current.

"*All other muscles* respond quickly to faradism and to galvanism.

"All *voluntary power* present save in use of deltoid where no voluntary power is present.

"*Sensation:* Slight area of hypo-algesia over outer surface of arm, circumflex area."

Having noted the presence of a small scar at the back of the shoulder, he made and recorded his diagnosis as a "lesion of the circumflex nerve from small foreign body entering the deltoid muscle," and requisitioned an *x*-ray "to show foreign body about neck of humerus." The *x*-ray (Fig. 1) duly demonstrated the presence of the offender lying posterior to the surgical neck of the humerus, reminding one of the story of the discovery of the planet Neptune, whose existence and precise location were revealed through its disturbing influences.

The patient was kept under observation and treatment for a further period of two months without signs of improvement and the response to galvanic current was found to be diminishing; he was accordingly transferred to the surgical division "for removal of the foreign body and suture of the nerve if possible."

On January 23rd, 1919, twenty-four weeks after injury, operation was undertaken. Under ether anæsthesia an incision was made along the posterior border of the left deltoid, which was carefully reflected upwards, and a cube-shaped metal fragment smaller than a pea was found beneath the deltoid close to the humerus. The circumflex nerve and vessels were isolated as they issued from the quadrilateral space. The nerve was carefully freed distal to the branch supplying the teres minor and was found to end in a small bulbous enlargement close to the site of the foreign body. By what must be regarded as good fortune, branches, three in number, were identified in the muscle substance beyond the lesion, which had evidently occurred just at the point of division of the nerve. These branches were loosely bound together with very fine catgut and the freshened ends anchored to the vivified proximal portion. Accurate end-to-end approximation by the usual method was

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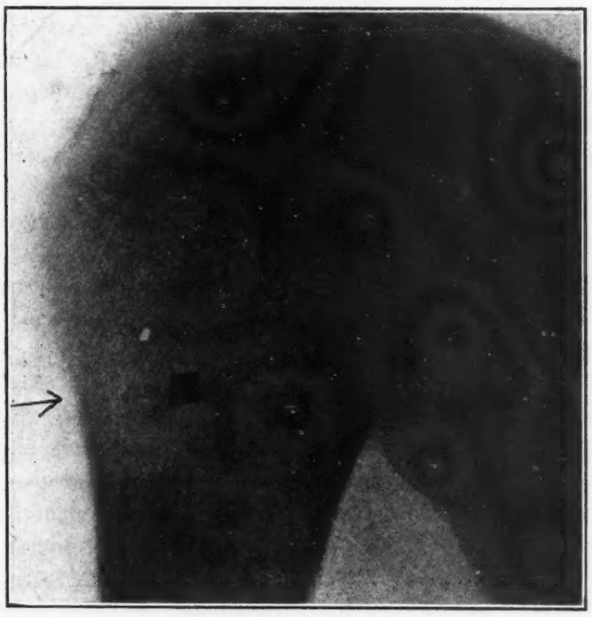
impossible owing to the small size of the nerve, but a measure of continuity was restored, and the ends remained in apposition without tension even when the arm was fully abducted. The deep fascia was closed with catgut, the skin with silkworm gut, and the arm bound in full abduction on a splint. Following healing by primary union the stitches were removed on



LEFT SHOULDER JOINT

Note Foreign Body which Injured the Circumflex Nerve

February 3rd. On February 12th the deltoid reacted to 2·0 microfarads, condenser current. On February 22nd, twenty-nine days after operation, the patient was re-examined by Mackay who recorded the following observation: "Now voluntary power in deltoid to slight degree, with rapid recovery." On February 27th, five weeks after operation, he had power in the deltoid to the extent that he was able while in the recumbent position to move the arm from the side laterally to a right angle, and when standing upright to hold the arm horizontally against gravity. The sensory impairment had almost disappeared. He was boarded for invaliding to Canada and continued to gain strength in the muscle up to the time of his departure.

If we disregard the lesion to the brachial plexus, which was transitory, and possibly due to hæmorrhage above the clavicle, the resultant injury in this patient was due to a complete division of the circumflex nerve. The clinical picture before operation clearly indicated this—the deltoid paralysis and the area of hypoalgesia in the sensory supply of the nerve. It is well recognized that complete division of the nerve may produce but slight sensory disturbance owing to the associated supply from supra-acromial branches. Tinel[3] writes in this connection: "Sensory disturbances are somewhat reduced in paralysis of the deltoid. Seldom do we find complete anæsthesia; as a rule we simply have more or less hypoæsthesia of the external surface of the shoulder." The operation fully confirmed the clinical findings.

At the time of operation the prognosis was regarded as unpromising owing to the small size of the nerve and its branches, and the recovery came as an agreeable surprise. The rapid regeneration and early return of power is of special interest and is doubtless explained by the short distance the regenerative process had to travel.

References:

1. BUNTS.—"*Trans. Amer. Surg. Ass.*," 1903.

2. BENISTY.—"Clinical Forms of Nerve Lesions," 1918, chap. vii, page 120.

3. TINEL.—"Nerve Wounds," 1918, chap. xi, page 204.

THE RELATION OF PHYSICAL EXHAUSTION TO CHRONIC ILL-HEALTH

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WE all come across many patients who give an indefinite history and a long list of complaints. While the symptoms are numerous, on physical examination, very little if any actual disease is found. It is true that in a few cases some trifling disorder is found which is blamed for a long train of symptoms. Sometimes the appendix, occasionally the gall bladder, or frequently a slight perineal or cervical laceration or uterine displacement receives the blame. Where no abnormality is discovered the patient is told that he is run-down or anæmic or nervous. At first these patients are generally treated with tonics or bromides and are placed on a diet as a matter of routine. The patient generally tries this treatment for a while and as his personal habits were not altered the improvement if any is only of a temporary nature. When the patient returns with his complaints more extreme measures are considered. In those cases with slight localized abdominal pain, or when there is any other abnormality present such as above-enumerated, surgical interference is recommended. After the operation the patient feels well for a short time, then a relapse occurs. The surgeon then wonders why about 50 per cent. of the operations for the relief of symptoms are failures. The so-called run-down patients are advised to go to the country for a rest and those complaining of aches and pains are sent to bathing resorts. These patients return much improved and feel well for a short while. A few patients are taken to a hospital for observation and experimentation. These also leave the hospital much improved. In the course of a few months nearly all cases have relapses. When these patients come back with their old complaints they are then labelled as neurasthenics.

These patients may be divided into definite groups based on the symptoms present, as the gastro-intestinal type. They complain of anorexia, fulness in the epigastrium after eating, pyrosis, eructations, borborygmi and constipation. The causes of these symptoms may be traced to their mode of living.

A man works fifty-five hours a week, ten hours a day, week days and five hours on Saturday. Many men, however, work all day Saturday as well as several nights a week. This man usually resides some distance from his factory. He rises at five o'clock in the morning and does not eat any breakfast because he has no appetite or time to eat. He must leave his house not later than a quarter to six so as to allow a margin for tramway troubles and yet be able to reach his factory before seven. He starts work on an empty stomach and continues till twelve noon, then he stops for half an hour or an hour for lunch. The lunch that he brings with him was prepared the night before and is generally not very attractive or wholesome, but as he is tired and hungry he eats as a hungry man usually does, he eats fast, does not masticate his food but manages to fill his stomach. His lunch time is soon over and he rushes back to his work. At half past five or six in the afternoon he ceases work, rushes out of the factory, squeezes into a stuffy car, and if there is no breakdown in the tramway service he arrives home around seven o'clock in a tired and depressed state. Such a condition is not conducive to a good appetite, nevertheless he eats his supper. When he is through with his supper he finds a little work to do around the house or else he amuses himself by reading or attends a cinema show or a union or lodge meeting. When he is ready to retire for the night it is usually eleven o'clock or later. From eleven in the evening to five in the morning he obtains six hours of rest when not disturbed. On analysis one finds that this man rested for six hours, spent two hours in very bad air in street cars, worked ten hours, passed two or three hours in bad air at a picture show, theatre or meeting hall and had but two indifferent meals which he did not eat properly, in the twenty-four hours. The young and robust stand this life for a while. The let up in the week end, half holiday on Saturday and Sunday help to tide the person over for a while, but sooner or later a break occurs and the stomach, having been punished most, is naturally the first to suffer. The patient begins to complain of indigestion, he consults a doctor who prescribes some medicine, places him on a restricted and easily digestible diet. The patient improves for a while but it does not last long for we all remember the fable in which the heart and stomach were at war, a restricted diet is not suitable for a man doing hard work. He comes back, with his complaints, to the physician who on examination may find slight localized pain or a pain may develop through mental suggestion. The attention of the patient becomes fixed on some slight abnormality which increases in proportion as the physician lays stress on slight localized abdominal pain, and operative interference is accordingly advised. After the operation the patient feels fine,

which is really due to the enforced rest and proper feeding as well as to the leading of a more natural life. But as soon as he returns to his old habits, a relapse occurs and the old symptoms return.

Clerks and business people form the anæmic and rheumatic type. They usually complain of headache, backache, lumbago, anorexia, and weakness. On examination they are found to be anæmic and the muscles of the back and legs are found to be tender. These cases are diagnosed as either anæmia or rheumatism depending on the attitude of the physician, whether he lays more stress on the anæmia or pain. In the anæmic cases iron tonics are prescribed and in the rheumatic cases liniments and ointments are prescribed. In both varieties of cases there may be a slight improvement for a while. When they come back the physician sends the so-called anæmic cases to the country and the rheumatic cases to mineral bath resorts. These patients after a prolonged stay in the country or after taking numerous baths return much improved, in fact cured, but in a few months or even weeks the old condition returns. A simple explanation for these ailments may be found in the living conditions of these people. The clerk rises at seven in the morning, has a slight breakfast or none at all, rides to work in a stuffy street car for about an hour and reaches a stuffy office at nine o'clock. He works till twelve and has an hour for lunch, which he eats in a crowded dining-room or else he is standing up at a lunch counter when there is no room at the tables. He eats as fast as he can, then has a smoke and goes back to his stuffy office where he works till five. He then squeezes into a stuffy street car and reaches home about six. He then dresses for dinner and by the time he is ready to eat, he is all fagged out and has lost his appetitte. This is the result of vitiated air and perhaps of bad posture which these people often maintain during their working hours. In the evening he spends several hours at some form of recreation or amusement, retiring generally not before midnight. The result is that these people do not obtain sufficient sleep, and rest only six or seven hours a day and take an insufficient amount of nourishment. They therefore rise in the morning tired, and begin the day in a physically exhausted state. In time nature begins to call for a halt to this mode of living by inducing the train of symptoms enumerated.

Sales people generally complain of pain in the legs and in the sacral region, these cases are disposed of as being lumbago or rheumatism. They are treated with plasters, liniments and ointments with indifferent results. The explanation for the persistence of these pains is very simple. These people start to work at eight o'clock in the morning and work till seven in the evening with one hour off for lunch. On Saturday they work till eleven in the evening, with one hour off for supper. As most of the stores keep open other nights during the week it follows that these people are on their feet for at least ten hours a day, while in most cases they are on their feet for thirteen or fourteen hours a day without a proper rest. The stores are generally poorly ventilated, and in some of them the rays of the sun never enter to brighten the environment or to dry up the damp, humid and foul air. In stores where food is sold these people have to enter refrigerators where the temperature is twenty or thirty degrees lower than the store temperature. The sudden exposure to such a variable temperature accounts for some of the muscular pains as found in myalgia. The pain in the sacral region can be explained by the fact that the sacrum acts as the keystone of the trunk. The weight of the body being constantly applied to the sacro-iliac ligaments the pressure and tension produce the pain when overstrained. Unless the cause be removed a plaster can only afford slight and temporary relief.

There is also a cardiac group. These patients come to the doctor complaining of heart disease giving the following symptoms: palpitation, pain or an uncomfortable feeling in the sternal area, dizziness, headache and in severe cases a sinking feeling fearing an attack of syncope. On examination no abnormality is found except perhaps a low blood pressure ten to twenty points below normal. The patients are assured that there is nothing wrong with their hearts but that the condition is caused by indigestion. As most of these patients do not improve on a diet with digestive aids, they are put down as neurasthenics. At the end of two or three years some of these patients die suddenly while others develop cardiac irregularity and murmurs. A little thoughtful application of physiology is sufficient to explain the condition. We are aware of the rapid and sudden response of the heart to the various changed moods of the individual. Fear, joy, sorrow, sudden changes in posture and excitement of any kind throw the heart out of rhythmic action and most of the time the number of beats is accelerated. The heart being a muscle why should it not behave like any other muscle? We all know that when muscles are overworked, as by walking long distances they begin to ache without showing pathological changes. Then why should we not assume that when the heart is overworked it also gets tired and begins to ache without showing pathological changes for a while. The argument may be advanced that the heart muscle differs in structure from ordinary striped and unstriped muscles, therefore it ought to behave differently. Granting that it does behave differently and it can stand exertion much longer than the other varieties of muscle; but assuredly it must have a limit of endurance and when that limit is reached it would act like other muscles. If this condition were recognized early, it is fair to assume that many lives would be saved either from a premature death or from chronic invalidism. According to statistics compiled by "The

Metropolitan Life Insurance Co.," the death rate from organic disease of the heart is second only to that from tuberculosis, and while the death rate from tuberculosis is constantly decreasing, that from organic heart disease is increasing. During the decade from 1900 to 1910 the death rate from organic disease of the heart increased from 116 per 100,000 to 161·6 per 100,000, an increase of 39·3 per cent. During the same period the death rate from tuberculosis declined from over 200 per 100,000 to 158 per 100,000. During the same period the death rate from arterial diseases increased from 5·2 per 100,000 to 25·8 per 100,000, an increase of 396·2 per cent. That physical exhaustion is responsible for this higher death rate is proven by the fact that between the twenty year period, from twenty-five to forty-five, during the most active period of the life of the individual, the death rate is very much higher for males than for females in the wage earning element of the population. The average death rate at that period is for males 85·5 per 100,000, while that for females is only 69·1 per 100,000. Similarly when one compares the death rate of the wage earning element with that of the general population, during that twenty year period, it is found that while the approximate average death rate of the general oppulation is 55·7 per 100,000, that of the wage earners is approximately 77·4 per 100,000 or 139·1 per cent. as great. During the same decade, from 1900 to 1910, the death rate from Bright's disease rose from 81 per 100,000 to 95·7 per 100,000, an increase of 18·1 per cent. This difference in mortality rate can only be explained by the cumulative effects, upon the vitality of the wage earning element, of more severe conditions of life and work, affecting the male sex more severely. It may safely be said that this increased frequency in the degenerative diseases is a distinct tendency in modern life, and corresponds to the increased industrial activity. These diseases bring about hardships and distress which cannot be shown in figures; for owing to their incidence among adult males they strike heavily at the chief or only income producers in families. Very often families have to struggle through long periods of sickness in which the wage earner has been unable to work even part of the time. Long before any actual cardiac disease is discoverable, signs of physical exhaustion appear. Unless this condition is promptly treated by rest and removing the cause if possible, it becomes pathological. In other words a prepathological cardiac condition ought to be recognized. Such a recognition would prevent a great deal of poverty among the industrial element of our population.

In the gynæcological type of physical exhaustion the patients complain of pain in the back, weakness, irregular menstruation, menorrhagia, leucorrhœa and headache. These cases are generally treated with douches and tonics. When they do not improve and if a gynæcological examination reveals a slight uterine displacement or a slight cervical or perineal laceration an operation is advised. This treatment occasionally brings relief to the patient for a while, due more to the enforced rest than to the operation itself. In most cases the old symptoms return in the course of a few weeks or months. These patients are also relegated to the human junk heap known as neurasthenia, while an analysis of the life led by the average married woman will reveal the causes. She rises at six in the morning to prepare a cup of hot coffee for her husband before he goes to work. She then wakes her children, dresses them, washes and feeds them and send the older children to school. This takes her till about half-past eight, then the younger children or baby require attention, which takes her to about half-past nine. The woman must now run out to make her purchases, for generally she has no telephone or maid and by doing her marketing personally she is often able to save a few cents. When she returns it is half-past ten, she must then start to prepare dinner for the family, which includes a boarder who is generally taken to reduce the rent bill. The woman, having prepared the dinner, starts in the cleaning of the house. After an hour's work she remembers that she has not eaten anything yet. While she is considering what to eat, the cooking dinner requires attention or else one of the children wants something. She forgets her hunger and attends to the dinner and children. At noon she eats the first particle of food so far for the day. But this food is not eaten the way mortal beings should eat, for she is disturbed frequently, during her meal, by attending to the others who have to be served. She manages, however, to race through her dinner and sends her children off to school again and her husband, if he had lunch at home, to work. After cleaning the table and washing the dishes she has to think about washing clothes and scrubbing the floors. By this time the younger children become irritable and get on her nerves, so that when the older children come from school she is only too glad to send them out in the street to play so as to enable her to finish her work. After this she has a double anxiety which increases her nerve tension, namely, the safety of her children in the street and the desire to finish her work in the house. Soon after she has to prepare the supper and when she finishes her supper and cleans up she finds that it is already half-past seven in the evening. She then starts mending or sewing clothes for the children, for there are usually five or six children in the family; consequently economy must be enforced, otherwise there will not be sufficient money to cover the living expense as well as for clothes and medical attendance. By the time that she gets the children to bed it is ten o'clock in the evening. The woman herself now drops off to skeep, but sleep for her is not of the restful kind, for she sleeps in an overcrowded stuffy and poorly ventilated room. All the extra family clothes are kept in the bed rooms.

Often as many as four individuals occupy one small bedroom. During the night a child wakes up crying with a toothache or the baby has an attack of colic or else it has to be nursed. The result is that the woman wakes up in the morning not much rested. This monotonous hard life continues day in and day out without any change, except when the woman gets sick or is confined, then she has a rest for a few days. Is it any wonder that these women complain of backache and menstrual disturbances when the pelvic organs are continually congested, and will a gynæcological operation cure or even improve the condition of such a patient when the disturbance is caused by physical exhaustion.

Similarly a sales girl is on her feet for eight or ten hours a day. A girl in a factory may be sitting in a cramped and ill-adapted posture for the same number of hours while at work. As a result of the continual strain caused by the weight or attitude of the body on the pelvis, the pelvic organs become congested, resulting in menstrual disturbances. For similar reasons menorrhagia is often encountered in very anæmic women. Consequently a curettage would not benefit these cases for the causative agent is not removed by such a procedure.

Treatment. As pointed out above, any form of treatment, the essential element of which is based on rest, brings about a temporary amelioration of the condition. However, surgeons ought to keep their patients under observation for a time, under favourable conditions, before deciding to operate in, chronic and obscure cases, so as to exclude physical exhaustion as a cause. This would reduce the number of surgical failures so evident at the present time. Similarly it is hard to understand how a test meal given a patient, the first time that he enters a doctor's office, will throw any light on the function of the stomach. It must be remembered that the stomach is not a test tube and that so many factors influence the function of the stomach, in civilized man, that one can only expect to arrive at approximate results under the most favourable conditions, which are hardly present when a patient comes to consult a doctor, in his office, for the first time. In order to obtain permanent results and overcome this modern tendency to early physical deterioration, which is worse than the ancient epidemics, in net results, though less spectacular, people must be taught how to live properly. In order to employ prophylactic measures efficiently, the various human activities must be considered in their elementary forms. This can be accomplished by grouping them into the following divisions: *food*, *rest*, *labour*, and *amusement*.

Food. Although food is known to be a vital necessity for living organism, yet under ordinary conditions human beings pay very little attention to the quality or quantity of food ingested. Most people expect to get along very well by passing over the morning meal, simply taking a cup of tea or coffee, eating the noon meal indifferently, or else eating a dry lunch prepared the night before, and rushing off the evening meal so as to be in time for a business or social appointment. The human body like a furnace cannot produce sufficient energy without sufficient fuel. The body, unlike a furnace, will utilize reserve energy for a while, but a limit is reached when the reserve is spent, and the whole animal body begins to suffer. The individual loses in weight, gets weak and becomes inefficient. For a while these people may supplement their deficient diet with cod liver oil, but in time even this addition is insufficient to keep them in good health and a breakdown occurs. Medical men are wondering why women cannot nurse their babies at the present time as well as women did formerly. The answer is that a farmer does not expect to draw milk from an overworked and underfed cow, why should a human being be an exception in nature? The women at the present time do not eat enough to be able to provide sufficient energy for themselves and sufficient food for their offspring. In order to maintain good health sufficient time must be devoted to taking food; attention must also be paid to the quality and quantity of food. Some so-called dietetic experts and vendors of special kinds of food emphasize their pet theories by quoting the Biblical passage, "Of every tree of the garden thou mayest freely eat," interpreting it that man was meant to be a vegetarian. But these theorists seem to ignore the fact that this injunction was uttered before the woman was there to tempt the man, and as soon as the man and woman did eat of the fruit of Wisdom, the Lord realized that there was not sufficient variety of food in the garden of Eden to meet the new requirements of the human race. Adam was then ordered out into the world to produce and obtain the additional varieties of food to meet the new conditions of intellectual development in man. One never looks for great mental accomplishments in herbivorous animals like the cow, but one does find a great amount of mental activity in carnivorous animals such as the fox and dog. The herbivorous animals are bulky and have great muscle power while the carnivorous animals are of reduced size but more intelligent. Therefore man having both mental and physical powers developed to a high degree must have a combination of food; he thus becomes an omnivorous animal. Similarly civilized man requires other food than the savage does. While the savage is satisfied with raw or sun baked food, civilized man must have cooked and prepared food. The more civilized man becomes, the more complex becomes his food, both in variety and in the method of preparation, as well as in the manner of serving it, so as to tempt the palate, as Shakespeare said: "The sauce to meat is ceremony —good digestion wait on appetite and health on both." Consequently speaking of food in caloric values is not sufficient to satisfy modern requirements,

as Hippocrates long ago said: "An article of food or drink which is slightly worse but more palatable is to be preferred to such as are better but less palatable." While the industrial evolution was very gradual in the last nineteen centuries, it made very rapid progress in the present generation, so that a man accomplishes as much in a day at present as his grand sire accomplished in a week. This increased activity dissipates a greater amount of mental and physical energy, so that though the working hours are shorter and the hygienic surroundings are better, these in themselves are not sufficient to compensate for the increased expenditure of energy in modern times. As a result, physical exhaustion ensues early in life from malnutrition. These people being in the prime of life are unwilling to lag behind, so they seek relief in the use of either stimulants or narcotics. Simply passing laws to prohibit their employment does not prevent them from obtaining these drugs or beverages. To remove the cause for their desire, these individuals must be brought back to a normal state of nutrition by providing them with proper and sufficient food, eaten at proper intervals and under proper conditions.

Rest. The rest period is very important in the life of the individual, but in order to obtain the proper amount of rest it is necessary to have rooms that are well lighted and ventilated and which are not overcrowded with useless furniture and clothes. Rest periods should also be provided during working hours in those occupations in which the worker is required to assume unnatural postures or when individuals are required to be on their feet for prolonged hours.

Labour. Labour is a very important factor in the production of human happiness. But in order to obtain the maximum of efficiency with the least dissipation of energy certain measures must be employed. Industry must not only consider economies in production, but must also consider such economies of human effort as will conserve the health and life of the individual working man. Inasmuch as the large shop or factory, where large numbers of working men congregate, is an outgrowth of modern industrial development; so in order to prevent early physical deterioration of our population, we must have legislative enactment and enforcement of certain improved working conditions, such as hours of labour, sufficiency of light, purity of air and the maintenance of a favourable temperature and humidity in the shop. Machines ought to be employed for the benefit of both employer and employee, so that when a new machine is invented working men will not hesitate to utilize it for fear that it will replace them in their jobs. It is unfair to compare the present hours of labour with those of fifty years ago, for the working conditions are not the same. Formerly the small individual shop was the rule. Thus a tailor worked in his house or in a little shop and he was required to make the whole garment. This enabled him to change his posture at intervals. He worked at the machine for a while in a certain position, then he would change his posture to do some sewing by hand, or would have to stand up to press the garment. This way he would set into motion different groups of muscles, so that while one group of muscles was active other groups were able to rest, and with the frequent changes of posture the body was able to stand the strain of longer hours with less fatigue. With modern large factories division of labour is the rule; thus tailors are divided into operators, who sit and work at machines all day; pressers, who press garments all day; and basters, finishers, etc., who do their little but important shares in the making of the garment. All these workers maintain one postural attitude peculiar to each branch all day long without change. Consequently fatigue easily sets in with the early development of physical exhaustion. What is true of the clothing trade is equally true of the machine shop and industry in general. Any efforts made to prevent or delay this tendency to early physical exhaustion will amply repay employers and the state for the additional expense involved, by increasing the product on the one hand in the extension of the span of life on the other. Workingmen ought to undergo medical examination at the time of entrance into an industry and periodically thereafter. Such periodical medical examination would often reveal physical defects or early organic disease. In such cases the early application of remedial measures would give good results. In cases where the nature of the work would tend to aggravate physical defects a change of occupation ought to be arranged. This would prevent chronic invalidism and poverty.

The overworked housewives, owing to the difficulty in obtaining domestic help have to rely entirely on their own ability to do the house work. It would, however, be of some help if, instead of lecturing to these women on how to bring up their children, the community would re-employ the war nurses, whose duty it would be to collect the children in assigned districts, and take them to a playground where they could be amused for a few hours a day. This would keep the children off the streets and diminish the number of accidents, and at the same time the mothers could have a couple of hours rest in the afternoon.

Amusement. The human race has developed a natural craving for amusement of all kinds, and the higher the degree of civilization the more varied become the forms of recreation and amusement. At present, in large cities, all places of amusement are concentrated into a restricted area to which all pleasure seekers must come. In most cases people have to travel long distances to reach their particular place of entertainment, and by the time they return to their homes it is usually past midnight.

An analysis of modern city life shows that the residential districts are usually situated in suburbs, while the theatres, dance halls and lecture halls are

usually situated in the centre of the city. People must be at the theatre or other place of amusement at eight o'clock. After the performance, at half-past ten, an hour or more is spent at some hotel or restaurant partaking of refreshments. Another hour or so is consumed in cars, returning home at about half-past twelve or one o'clock in the morning. As modern city life does not appear to be conducive to friendliness among neighbours, there is a feeling of loneliness in one's own home. In order to overcome this lonely feeling in a big crowd, people spend five or six evenings a week in the city, away from their homes, thus depriving themselves of a proper amount of rest. In time this lack of sufficient rest begins to tell, physically and mentally, and brings about a condition of physical exhaustion, terminating either in tuberculosis or in disease of the circulatory system. The remedy is not to advise people to refrain from amusement, but to alter the methods in vogue. This can be accomplished by utilizing the existing school buildings and grounds in each district for purposes of amusement. There is no valid reason why a school building belonging to the public and maintained in good condition with public money, should be closed most of the time. Instead of being compelled to seek amusement at some distance from home why could not the adult population of a district utilize a heated, well ventilated and a well equipped public building with a large gymnasium such as modern schools are provided with. The school gymnasium could be utilized for gymnastic classes, for exhibiting works of art, for dancing, for amateur theatrical plays, for cinema shows and for lectures. Class rooms when not required for regular work could be utilized for meetings of young people's local clubs, literary and debating societies. This would bring young people together under favourable conditions. Young boys and girls would not be forced to meet on street corners, but would have a regular meeting place constantly guarded by the various moral forces of the community and under the watchful eyes of friends. This would have a tendency to bring the people of the neighbourhood together, neighbours would get acquainted with each other and would also become more sociable. This would remove the necessity for people constantly to seek new forms of excitement in order to overcome the feeling of loneliness so prevalent in large cities. Young people would not be forced to seek recreation in stuffy picture shows and dance halls of doubtful moral character. Such an arrangement would have a tendency to diminish crime and delinquency. This would also have a beneficial effect on people generally. They would not have to rush through their evening meal in order to be in time for their particular form of amusement, for it would eliminate the travelling of very great distances. People could be home sufficiently early to enable them to get an ample amount of sleep and rest. This would be conducive to health and efficiency. We would then see fewer men and women in their prime of life pale-faced, discontented, ill-tempered, ill-nourished and in poor health when they ought to be cheerful, happy, pleasant, agreeable and healthy.

In summarizing I would say that the medical profession ought to take a broader view of public life and health, for the wealth and progress of a community depends on the health of the individual members forming the state.

Beginning with the January issue, the Medical Review of Reviews of New York will inaugurate a new department for the advancement of the science of Chemo-Therapy.

In order to develop the theories as set forth by the various investigators who have thus far entered this field, we invite the co-operation of all physicians, chemists, bacteriologists and pharmacologists who are doing or contemplate doing work along these lines.

It is our purpose to stimulate a more thorough fundamental knowledge of this subject, which, so far, is little known to a great number of practicing physicians.

Believing Chemo-Therapy to be a rich field for the development of products of great therapeutic value, and that we have so far neglected to give it the importance that past researches would warrant, we are placing this department at the disposal of all those who may find an interest in the subject, as an open forum where contributions dealing with this science will be welcomed.

Case Reports

TWO FATAL CASES OF CHRONIC NEPHRITIS

From the Vancouver General Hospital. Presented by Dr. Strong

Case No. 1. Illustrating Prognostic Importance of Functional Kidney Tests.

S. A., admitted June 21st, 1920, male, age thirty-three. Roumanian, unmarried.

Complaints. Failing eyesight—"kidney trouble".

Past History. Always well in the past except for an operation for appendicitis in 1913.

Family History. Negative.

Present Illness. Two and a half months before admission, patient had a "severe cold". Following this, he noticed some palpitation, shortness of breath and cough. Two months before admission, patient began to have difficulty in reading the newspaper. Sight has been getting worse since. Patient has been losing strength rapidly, and, because of his weakness, was forced to stop his work.

Personal Examination. Definite urinous odour to breath. *Heart:* 15 cm. wide in the 5th intercostal space. Aortic second sound is greater than the pulmonary second. Vessels, sclerotic. Blood pressure, 218-130. *Eye grounds:* Intense neuro-retinitis with some small scattered hæmorrhages. Albuminuric retinitis. Temperature, 98·2°; pulse, 75; respiration, 24. *Urine:* 3630 c.c. in 24 hours, S.G. 1012. Albumin present, no casts. *Wassermann test:* Negative. *Phenolsulphonephthalein test:* 5 per cent. *Mosenthal:* Fixation of quantity and specific gravity. Retention of chlorides.

Treatment. Mag. sulph. each morning; milk diet; hot packs; low protein diet; brandy; measures to control vomiting; venesection.

Progress Notes. July 7th: Urinary output fell to 930 c.c. per day, with S.G. of 1006.

July 14th: Patient began to show signs of uræmia, such as nausea, vomiting, change of disposition. He became surly, drowsy, listless and refused medication.

July 16th: Urinary output decreased, 500-700 c.c. in 24 hours with S.G. of 1005. Temperature 95-97°.

July 20th: Patient had severe epistaxis. Blood pressure, 198-114. These hæmorrhages continued until his death on July 23rd.

Autopsy Findings. Diagnosis: Chronic interstitial nephritis, hypertrophy of the left ventricle, œdema of the lungs, chronic peritonitis, pleuritis, (right) and perihepatitis, acute pericarditis, acute endocarditis, atheroma, atrophy of the spleen, slight double hydrothorax, healed operation wound, appendix absent.

Case No. 2. Fatal Chronic Nephritis with Positive Wassermann. Hypertension. Lowered Kidney Function to Phthalein. Hyposthenuria and Multiple Hæmorrhages. Uræmia. Albuminuric Retinitis.

J. M., admitted July 28th, 1920, male, age fifty-five, single, English. Sailor and longshoreman.

Complaints. Breathlessness, pain in back.

Past History. Yellow fever when 14 years old; malaria when 16; gonorrhœa when 18; probable chancre when 43; rheumatism when 49; severe cold in December, 1919, continuous cough since then.

Family History. Negative.

Present Illness. Shortness of breath first noticed April, 1920. This has increased so much that, at the present time, patient is obliged to sit up. During the past two months, he has noticed a swelling of his ankles at night. Has had pains in the præcordium and pain in the lumbar region for three weeks.

Personal examination. Urinous odour to the breath. *Heart:* 17 cm. wide in its greatest diameter, sounds very soft; no murmurs heard. Blood pressure, 180-130. *Eye grounds:* showed choked disc and albuminuric retinitis. Temperature, 98°; pulse, 75; respirations, 20. *Urine:* 300-500 c.c. in 24 hours, with S.G. of 1012, albumen present; some granular casts. *Phenolsulphonephthalein* test, July 30th and August 2nd, less than 1 per cent. *Wassermann:* blood strongly positive. Spinal fluid negative. Blood examination: Hgb. 85 per cent.; R.B.C., 3,984,000; W.B.C. 10,000. Polymorphoneuclears, 89 per cent. *Mosenthal test, July 30th*: patient refused diet on two occasions, but there *was a slight fixation of S.G. and much diminished output* and no chloride retention.

Treatment. Milk diet, force fluids, followed by saline intravenously. No relief. Venesection 420 c.c. of blood removed. Spinal puncture was done. Fluid clear and not under pressure. No relief of symptoms. Systolic B.P. lowered 14 mm. Caffein citrate 1 gr. every 4 hours. No effect. Pilocarpine, 1-12 gr. twice daily. No relief. Biniodide of mercury given; no results.

July 31st: Patient complained of severe headache. Respiration, Cheyne-Stokes, periods of apnea 30-45 sec. Patient nauseated. Vomited frequently. Blood pressure, 190-130.

August 5th: Delirious. Blood pressure, 198-110. Convulsive movement during periods of apnea. Spinal puncture done. August 7th: Condition very poor. Blood pressure 170-120. Some small subcutaneous hæmorrhages on the back of the hands.

August 9th: Hæmorrhages from bowels and numerous subcutaneous hæmorrhages. Spitting blood. died 8.50 p.m.

Autopsy Findings as follows: Diagnosis: Chronic interstitial nephritis, chronic myocarditis, atheroma, chronic endocarditis and epicarditis, chronic pleuritis, peri-splenitis, jaundice, cyst on right kidney (upper pole), hypertrophy of both ventricles, dilation of both ureters, petechial hæmorrhages under mucous membrane of large bowel, hypertrophy of adrenals, broncho pneumonia, œdema of both lungs, fatty liver, passive congestion of spleen.

The pathological specimens were then presented by Dr. R. H. Mullin, and the pathology of nephritis discussed.

Following this, there was a general discussion in which all members took part. The fact was pointed out that, in Case No. 1, the urinary output and the specific gravity dropped just 7 days before any clinical symptons of uræmia appeared.

This drop in the 24 hours amount and in specific gravity, is by some considered an important diagnostic finding—and it was in this case.

The prognostic significance of the phenolsulphonephthalein test was pointed out. It was of especial value in these two cases.

Treatment received most attention during the discussion. The value of various methods of depletion was compared, and it was agreed that in uræmia it was usually necessary to try them all: Venesection, catharsis, diaphoresis and diuresis.

They probably are of value in the order mentioned.

HOSPITAL CLINIC ON SYPHILIS OF THE NERVOUS SYSTEM WITH A CASE OF TABES DORSALIS

From the Vancouver General Hospital. A clinic by Dr. Weeks

SYPHILITIC disease of the nervous system has been divided into two groups, depending on whether the specific organism attacks, (a) The connective tissues, vessels and meninges, or (b) The nerve substance itself.

As one would expect, the lesions of the first group are termed interstitial syphilis,—those of the second being designated as parenchymatous, and being synonymous with parasyphilis.

Parasyphilis is the term Fournier adopted to indicate those late results of syphilis which were considered not to be direct manifestations of the disease, such as are mucous patches and gummata, but indirect results depending in some way upon a devitalization of tissues induced by the action of toxins.

Tabes and general paresis of the insane are the two forms of parenchymatous syphilis to which most attention has been devoted. The pathological work of Mott on this continent has, in later years, strengthened the growing opinion that both of these diseases are definitely syphilitic in nature. The Wassermann test and the discovery of the spirochætes in the tissues of the brain and spinal cord by Noguchi have practically dispelled all remaining doubts. Then the diseases formerly known as parasyphilis, and considered to be indirectly due to syphilis, are really, in a very great majority of cases, directly due the activities of the treponema pallida, and must therefore be viewed as clinical manifestations of the activity of that organism.

The diagnosis of both interstitial and parenchymatous forms of neuro-syphilis is greatly assisted by the Wassermann reaction of blood and cerebro spinal fluid (the latter being the more valuable aid), and the colloidal gold reaction, which gives typical curves in the two outstanding forms of the parenchymatous category.

As the case which will be presented to-night has been placed in the parenchymatous class, we will discuss in more detail, that particular type.

It is often very difficult to obtain evidence of syphilitic infection in a case of suspected tabes dorsalis or general paresis of the insane, yet Wassermann tests of blood and cerebro spinal fluid give a positive result in almost every instance of general paresis of the insane and in a large percentage of cases of tabes.

The first stage of the infection may be entirely unnoticed or have responded so readily to local treatment as to have caused no suspicion as to its nature. Following it, a lengthy period of quiescence is usually noted—a period during which the organisms remain latent. This period extends over an average of about twelve years. When activity recommences, nerve degenerations begin to manifest themselves and the early symptoms of parenchymatous syphilis of the nervous system arise.

The case we wish to present is that of G. D., age fifty-two; single; English; miner by occupation. Admitted August 25th, 1920, complaining of dizziness, staggering gait, numbness of the hands and twinges of sharp pain in the lower extremities. His Wassermann was negative in blood, positive in cerebro-spinal fluid. Cerebro-spinal fluid cell count, 70; lymphocytes predominating. Butyric positive. Fehling's positive.

Personal History. Syphilis twenty years ago; following infection, he took mercury pills for a year. Rheumatism eighteen months ago. This was evidently considered a luetic manifestation for he was given six doses of anti-specific treatment intravenously and some intramuscular mercury. Influenza and

bronchitis in January of this year, since when he has been able to work but little, owing to attacks of dizziness, and weakness of the lower extremities.

Family History. Father died of apoplexy, aged sixty. Mother alive and well.

Present Illness. Onset about six weeks prior to admission when he noticed a dizziness which caused him to stagger. Loss of sexual power was noticed two years ago. There has been some interference with the bladder reflex in that there has been "waiting" at times. There has been also some loss of visual acuity; patient has worn glasses for twenty years. There have been, and are still, sharp twinges of pain in the lower extremities which are not neuralgic or arthritic in nature. Some sensory disturbance in left forearm, hand and left side of chest. No visceral crises or girdle pains.

On admission, physical examination of cranial nerves showed:

1. Normal. No anosmia or parosmia.

2. Some blurring of right disc. Left normal.

3, 4, 6. Pupils contracted and irregular. Reaction to accommodation but not to light. Extra-ocular movements normal. No nystagmus. No ptosis.

5. S and M normal.

8. A.C. is greater than B.C. Weber, negative.

7, 9, 10, 11, 12. Normal.

Sensation. No anæsthesia or analgesia over head, trunk, or upper extremities. Some analgesia in scattered areas below knees. Pain over ensiform cartilage yesterday attributed to paræsthesia. Thermal sense normal. Position, normal. Deep muscle sense markedly lessened. Testicular sense, normal. Tendon sense lessened. Bone sense lessened (tuning fork).

Motion. Muscular power, normal. Tonus lessened especially in legs. Hypotonia.

Reflexes. Superficial. Abdomen lessened. Crem. active. Plantar, flexor, Oppenheim, Gordon negative. Superficial anal lessened. Bulbo cavernous lessened. Deep, upper extremity, left is greater than right. Lower, K.J., absent. A. J. absent.

Co-ordination. Dynamics lessened in lower extremities. Romberg very marked. Cannot walk in straight line with eyes open. Base of equilibrium widened.

Differential Diagnosis. In making a diagnosis of this case several diseases other than tabes dorsalis were taken into account.

Peripheral Neuritis. (Alcoholic or diabetic) ruled out by presence of the Argyll Robertson pupil and there being little if any actual loss of muscular power.

Ataxic Paraplegia. In our patient we have no spasticity, no increase of knee-jerks as we would expect to find in this condition.

Cerebellar Disease. The knee-jerks are almost always present and the ataxy is not increased by closing the eyes.

Disseminated Sclerosis. Loss of knee-jerks is *very* uncommon and moreover the staccato speech and the intention tremors are usually marked enough to be noted by even the inexperienced observer.

Pain in the back, loss of power of flaccid or spastic types and variability of symptoms would have indicated a necessity for considering spinal syphilis.

Treatment. Two neodiarsenol treatments intravenously—0·06 and 0·09 gms. respectively. We hope for an arrest of the onward march of the disease, which is, we believe, the best prognosis we can give.

IMPORTANT NOTICE FROM DEPARTMENT OF HEALTH

THE Department of Health some weeks ago mailed to all physicians, veterinary surgeons, dentists and druggists in Canada, a form on which to make a declaration as provided under the Act, showing whether they are engaged in the sale or distribution of narcotics.

It is to be noted that all physicians who obtain narcotics in any quantity to adminster directly to their patients, are considered to be engaged in the distribution of these drugs; likewise all dentists and veterinary surgeons who obtain supplies of these drugs for use in connection with their practice, are considered to be engaged in the distribution of narcotics, and it is, therefore, necessary for them to make the declaration as required under the Act as amended at the last session of Parliament.

Very heavy penalties are provided under the Act for neglecting or refusing to furnish the declaration in question: a fine of not less than $200 and costs, and not more than $1,000 and costs, or to a term of imprisonment of one year, or to both fine and imprisonment, being the penalties specified for non-compliance with the regulations.

Any physician, veterinary surgeon, dentist or druggist who may have mislaid the forms sent by the Department, may, upon application to the Department of Health at Ottawa, obtain further copies in order that the necessary declaration may be filed.

As a number of physicians, veterinary surgeons, dentists and druggists have not so far sent in the required declaration, the Department has advised the Editor that unless this declaration is received within a reasonable period, the law will be enforced and penalties levied upon all delinquents.

Editorial

THE LIABILITY OF THE MEDICAL PROFESSION IN THE COMMITMENT OF THE SUPPOSEDLY INSANE

A MEDICO-LEGAL incident of very genuine importance to the medical profession has recently been brought to our notice. Two physicians having individually and independently examined a patient with respect to his insanity, certified in favour of his commitment to an asylum. Shortly thereafter he was released by the authorities of the institution, and the doctors were brought to trial (before the Ontario Supreme Court sitting at Ottawa) charged with conspiracy to deprive the plaintiff of his liberty and compelling his removal to and detention in an Hospital for the Insane. While the result of the investigation proved that the physicians had acted in good faith, that they had made careful and independent examinations and were disinterestedly concerned to do what was right for the patient, the incident brings, nevertheless, to our notice the great responsibility which attaches to these duties on the part of the medical practitioner.

It is obvious that the law, as laid down, provides very reasonably, for the protection of the patient on the one hand, and of the relatives and the public on the other. It recognizes the fact that physicians are at times, obliged to act in emergency, pending more careful examination in hospital, which is not possible prior to certification.

The decision in this case in favour of the physicians seems to have centered more on the question as to whether or not the doctors were acting in good faith and with reasonable care when they decided on the insanity of the patient, and on the fact that their examination was by no means superficial, and was as thorough and exhaustive as the urgency of the case, and the opportunity permitted. It was not held against the physicians that shortly afterwards the patient was released from the hospital, nor was it considered that this release implied a denial of any mental infirmity at the time of commitment; on the contrary, the evidence was conclusive that the plaintiff's actions could reasonably be attributed to mental weakness.

Briefly, the gist of the law takes it for granted that the physician is acting honestly, and that no legal relation exists between the physician and patient under the circumstances. Where doubt exists or where opinion may differ, a qualified medical doctor must be able to act without rendering himself liable for damages in court. The time has long since passed since it was supposed that an opinion on every mental case could possibly be accurate from one or even two cursory examinations. The necesssity for prolonged observation over days or weeks has already been recognized in every large centre in the country, and it is for this reason more than for any other that *psychopathic hospitals* have been established.

The treatment and consideration of mental defectives has been entirely changed in recent years, and has been placed upon a more sure and scientific foundation. It is high time that this country more fully recognizes the need for proper diagnosis, classification, and care of patients suffering from mental disturbances. The appalling and disgraceful conditions under which the insane have been till recently maintained in this country cannot be too strongly emphasized. One need simply refer to the strides already made by the Canadian Association for Mental Hygiene to realize along what lines improvements may be effected. Above all, there is a greater need for more thorough teaching of the subject of mental diseases in our universities, and a greater education of the public as to its significance both in respect of the community at large and State economy in particular.

REMARKS ON SOME GASTRO-INTESTINAL PROBLEMS

IN seeking for a solution of the diagnostic problems taking origin in diseases of the digestive tract the physician has been glad to call to his aid the results of research in the domain of pure science. Morbid Anatomy, by laying bare the end results of the disease process in ulcer and cancer and the infections furnished him with his foundation. To Chemistry he turned later when he looked for news of what was going on while the stomach was busy; later still Physics was commandeered by Cannon and his co-workers to render visible the motions of the viscera by means of the *X*-Ray. We are now reminded by Dr. Goldie's paper in this issue of the way in which embryology throws light upon some obscure matters concerning the nervous control of these organs, while at the last meeting of the British Medical Association Dr. Arthur Hurst of Guy's Hospital lucidly set forth the relation of psychology to some common gastro-intestinal disturbances.

Before even discussing such a subject this deponent would here and now with humility confess that as touching the inner circle of the psycho-analysists, he is an alien and a Philistine, but having made this confession, would then speak only as a mere physician to mere physicians.

Before the surgeons began to go into the abdomen both to administer treatment and to make a diagnosis, it was the custom to call every complaint beneath the pinafore a neurosis which did not show some gross or outstanding cause for its presence. The more or less indiscriminate entrance of the surgeons into the abdomen, whatever harm it may have done in other ways, was of the greatest value in proving that many of the so called neuroses had in fact their local habitations in the appendix, the gall bladder and the pylorus. When later the *x*-ray followed the surgeon and confirmed his views, many of us had the opinion, felt if not expressed, that all indigestion was divided into three parts, and that the greatest of these lay in the right iliac fossa, the second in the gall bladder, while the third, "which stretched toward the north," was the ulcer bearing area of the stomach. Having failed to prove any one of these to be present we either were frankly stumped or called it enteroptosis.

The article of Hurst referred to above covers a group of cases which have not been uncovered by either chemistry or physics or surgery, and while Dubois two decades ago clearly outlined similar groups, Hurst restates them so clearly, and in the light of war experience so convincingly, that one is justified in referring to at least two.

The frequent complaint of flatulence and the belching of gas is not unfamiliar to most of us, but Hurst points out that only in the case of cancer with obstruction is the production of gas in the stomach due to fermentation. In practically all other instances it is due to air swallowing, rendering its victim a first cousin to the equine crib biter or wind sucker. The cause is psychical and the cure is by psychotherapy. Experience has shown the correctness of this view, for, simple explanation of the nature of the trouble, and the demonstration of the impossibility of its causation by gases of fermentation are usually sufficient to bring about a cure.

The dependence of one type of constipation upon a false idea was strongly held by Dubois, and well restated by Hurst. At first by the ignoring of the normal reflex through laziness or false modesty, the idea of inability to empty the rectum becomes implanted in the mind, and a downward career of daily purgation is commenced and continues until enormous doses are required, in spite of the fact that there is no obstruction anywhere in the tract. Hurst formulates the working rule that if at the end of twenty-four hours the greater part of a barium meal has collected in the pelvic colon or rectum or both, dyschezia or inefficient defæcation of psychical origin may be diagnosed. The remedy lies in convincing the victim of the

nature of the trouble, and in patient re-education of the rectum, if necessary by graduated enemata.

It may be of service to emphasize a distinction between on the one hand a "Neurosis" which implies an hypothetical weakness of fibre due to any number of hypothetical causes, and on the other hand a mental condition in which under the influence of a false idea, healthy organs become slackers or incorrigibles in the physical community. The latter is the conception which best explains many otherwise inexplicable disorders. In referring to the intestinal hypochondriac one may be allowed to quote the words of Dr. Hurst. "He alone is happy and devoid of that most trying of the nervous disorders of the bowel, who follows Sir James Goodhart's admirable advice, to do as the dogs do and never look behind him."

ON THE USE OF LOCAL ANÆSTHESIA IN OPERATIONS ON THE UPPER AIR PASSAGES

THE report of the Committee appointed by the section on Laryngology and Rhinology of the *American Medical Association* to study and report on the use of local anæsthesia in nose and throat work is before us and contains many facts of interest to the profession in Canada. In answer to a circular sent out by this Committee to every fellow member of this section, letters were received from about 100 members. In these communications details were reported of numerous cases in which, after the injection of the local anæsthetic, toxic symptoms had suddenly developed, but fortunately had not ended fatally. Details of twenty cases ending suddenly in death were given which had not previously been reported. A review of the fatal cases shows that fourteen of them occurred within a few minutes after the injection of a solution of cocain and adrenalin. No evidence was stated to be at hand to indicate that the adrenalin in these cases was a causal factor, although deaths have been recorded following rapid injection of adrenalin in 1:1000 solution. Of the fourteen deaths due to cocain, five are stated to be due to accidental errors in preparing a too strong solution. The remaining nine, however, were evidently due to cocain injected into tonsillar, peritonsillar or submucous tissues in solutions not exceeding two per cent., in many cases only one-half per cent. As the report says we can conceive of nothing more distressing than a death occurring when least expected, within two or three minutes after the injection of the local anæsthetic to relieve the pain of an operation not immediately necessary to life, but one to which the patient submits at the surgeon's advice. According to the report almost all American operators prefer local to general anæsthesia for operations within the nostrils. In throat operations the unanimity is not so great; a small minority choose general anæsthesia, as they consider it permits greater rapidity in work, and more ease and comfort to the operator. Among the several conclusions arrived at by the Committee the following are in our opinion the most important. The patient should always be recumbent except in sinus operations when an elevation of 45° is allowable. In endo-nasal operations epinephrin should be applied first, and should be followed after a few minutes by a solution of cocain, for this drug still remains the most effectual of local anæsthetics. A synthetic drug may after this be injected into the tissues, but this injection must be made slowly. When any suspicion of danger exists, such as in cardiac disease or Graves disease, one fourth of the total amount of anæsthetic to be used at the operation should be first employed, and the patient watched for a few minutes, before using the remainder. They also recommend that each operation should be preceded by a hypodermic injection of morphine and atropine, and the patient kept, after the opera-

tion, for a time in the hospital. It is thought that the injection of morphine in the adult lessens the danger of the local anæsthetic and relieves the feeling of apprehension or excitement, which may be an added danger. The use of quinine and urea hydrochloride as a local anæsthetic in nose and throat operations appears to have fallen into desuetude owing to its liability to produce œdema and sloughing.

This report, which should be read in its entirety by all laryngologists and rhinologists, is of great practical interest to the whole profession. In our Canadian hospitals, however, while local anæsthesia is regarded as most suitable in endo-nasal operations, in throat work and especially for tonsil enucleation, the preference is for general anæsthesia as placing less strain both on the patient and on the operator.

Intra-tracheal anæsthesia, however, marks a distinct advance in this field of surgery. Once the tube is inserted in the trachea and full anæsthesia induced, the operator can proceed as freely as if the operation were in another part of the body. There is no gagging and the anæsthetic can be accurately and evenly administered. By this method there is no danger of aspiration pneumonia or pulmonary abscess, which, as everyone knows, is of vital importance. After the operation is over, air or oxygen can be readily given through the tube, greatly alleviating the usual distressing effects of the anæsthetic.

Writing on the subject of fatalities from local anæsthetics the *Journal of the American Medical Association* writes as follows: "The occurrence of twenty deaths in the personal experience of 100 operators shows that the subject deserves earnest attention. Real progress, however, can only be made if cases are reported promptly and with attention to the factors that are in question. As an illustration of the immediate practical benefit that could follow this inquiry, it is worthy of note that a fourth of the deaths reported to this section arose from mistakes in the strength of the solutions. Such fatally-ending mistakes may perhaps be avoided by preparing the cocain solution only as needed, from tablets coloured with a distinctive dye, so that the tint of the solution at once would call attention to the drug and its concentration. Physicians are urged to coöperate also by reporting cases of idiosyncrasy, to the end that further study may result in definitely establishing the causes of sudden death, and that a better understanding may be attained as to the proper technic and proper choice of local anæsthetics for each particular class of cases."

REHABILITATIVE WORK CARRIED ON BY THE ROCKEFELLER FOUNDATION IN CONNECTION WITH THE MEDICAL SCHOOLS IN CENTRAL EUROPE

TO assist Medical Schools in Central Europe, the Rockefeller Foundation announces a co-operative programme covering the following points: Aid in the rehabilitation of scientific equipment for medical teaching and research: Aid in furnishing medical journals to universities throughout Europe: An invitation to the authorities of Belgrade University Medical School to study medical education in America and England, as guests of the Foundation.

Colonel F. F. Russell, who has been in Prague since August serving as technical adviser in public health laboratory organization to the Czech Ministry of Hygiene, will arrange the details of the Foundation's co-operation with the medical schools. These activities of the Rockefeller Foundation in Central Europe are the result of investigations made there recently by representatives of the Foundation. The following extract from a report submitted to the Foundation by one of its officers sent to Europe to make a special inquiry into their needs, gives some idea of conditions in Central Europe with respect to medical education. Decisions of far-reaching significance in the matter of medical school support, the training of nurses, the

care of the sick and the prevention of disease must be made in these countries within the next few years. Expert guidance and some assistance in starting sound programmes now may mean much for generations to come. Medical schools of high rank and of long standing exist in the following cities of Central Europe: Vienna, Gratz, Budapest, Prague, Cracow. Other schools of importance are at Warsaw and Lemberg in Poland, at Innsbruck in Austria, at Zagreb (or Agram) in the Croatian state of Jugo-Slavia. This comparatively small number of medical schools serves a total population of approximately seventy-five million people. With the single exception of Austria, all the countries of the region under consideration suffer from a great shortage of physicians. There are reported to be less than 300 doctors in all Serbia. Outside of the Army Medical forces, less than 2,000 physicians are available to care for the twenty-five million inhabitants of Poland. Additional schools are needed adequately to serve these countries, particularly those of the south and east. There is a five year interruption of medical training in Europe which will affect the supply of physician savailable during the coming generation. The instruction of adequate numbers of physicians for the years immediately ahead is essential.

In all the universities of Central Europe the equipment (glassware, rubber, chemicals, and apparatus usually replenished year by year) has been very largely used up during the four years of the war and the two years of disorganized conditions and low exchange which have followed the armistice. The situation in Germany is somewhat different and that country is adequately supplied with medical schools and much scientific apparatus is manufactured in Germany. The greatest desire for American and British Medical Journals was expressed at every university visited. The journals are supplied on an arrangement whereby the university concerned pays in its national currency at the pre-war rates of exchange, the Foundation making up the difference due to loss in exchange. The Secretary arranged personally for the supply of journals to the following universities: Vienna, Budapest, Zagreb, Prague, Cracow, Lemberg, Warsaw. It is proposed to extend the services to Gratz, Innsbruck, and Bucharest, in Central Europe, and to some thirty of the principal centres in France, Belgium, Italy, and Germany. With the idea that Belgrade is one of the strategic points in a world programme in which a medical school must be established in the near future, it has been decided to invite a group of four (4) of the men responsible for its development to make a visit to America for study and inspection. It has also been decided that further assistance will be given by lending a technical adviser in the organization of medical education and that the Belgrade officials will be authorized to recommend to the Foundation from time to time as candidates for fellowships in specialized postgraduate medical study, persons who may be under appointment or consideration for the faculty of the proposed school in Belgrade.

Retrospect

RECENT STUDIES IN PROBLEMS CONNECTED WITH LACTATION AND INFANT FEEDING

ARTHUR B. CHANDLER, M.D.

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DURING the last few years much attention has been given by pediatrists to the problem of prolonging the lactation period, and of increasing the amount of breast milk available for the infant. As the result of this work they are discarding many of the older theories and practices. With proper care, it is found that the supply for the baby can be made much more abundant.

One of the frequent reasons given by a mother for having weaned her baby is that the milk was "no good". Further questioning reveals the fact that the baby was not gaining, and that it seemed uncomfortable, cried frequently, and sometimes vomited. Owing to these symptoms it was presumed that the milk was poor in quality, and the child was weaned on the advice of a physician, nurse, or friend. Sedgwick claims that it is rare in practice to be able to blame the quality of the breast milk. He discourages the frequent testing of samples which do not represent the milk of the complete feeding. Talbot has shown that a sample to be of any value must be a mixture of the first and last milk, or better still a sample from all the milk it is possible to express. He has shown that the first and last milk may vary as much as ten per cent. as regards the fat content. The appearance of the milk is worthless as a criterion of its quality. Frequently the most watery looking milk contains an excess of solids, while an apparently rich milk may barely be within the normal lower limit.

In cases in which the milk appears to be poor or defective the blame should be put where it usually belongs: either on the quantity of the mother's milk or on the baby itself. The only satisfactory way of determining whether the child is getting enough is to carefully weigh it before and after nursing. This must be done several times at different periods of the day, as the quantity taken may vary considerably. This procedure will generally reveal where the error lies. If the baby be strong, and yet the quantity of milk taken be small, the fault is generally in the quantity of the mother's milk. If on the other hand the child has defective nursing power owing to a hare-lip or because it is premature, excessively weak, or acutely ill, it may mean that the infant is unable by itself to get enough milk for its proper nourishment. Such children are unable to adequately stimulate the breasts so the milk gradually dries up: hence the very babies that need the mother's milk most are deprived of it unless we come to their assistance. If this be done by administering a supplemental feeding in a bottle and neglecting to stimulate the breasts, the latter soon fail and we are left with a baby usually impossible to raise on a bottle. Mothers frequently seek advice under the impression that their milk does not agree with the baby. Sometimes a child is getting too much milk and vomits the excess. It is well to bear in mind that all children's digestions are not normal, and if a child is gaining regularly in weight we can afford to overlook mild symptoms of distress or stools that are slightly abnormal. These children are on a better formula than any we can devise for them and soon adapt themselves to their surroundings.

Some infants exhibit an intolerance for fats as shown by vomiting, distress, colic, and either constipation or diarrhœa. In most of these cases the mother is robust and probably overeating and underexercising. Correcting the mother's diet and mode of living frequently is all that is necessary. It should be borne in mind that the last milk in the breast is the richest and by materially shortening the time of nursing the symptoms tend to correct themselves. If this plan is adopted, the mother should be taught to express the milk remaining in the breast after nursing, as failure to properly empty the breasts is one of the most frequent causes of a diminishing supply.

The anæmic, undernourished, nervous mother seeks advice because her baby does not gain, shows a tendency to vomit, and to have colic and putrefactive stools. The proteid of the milk has been blamed in these cases and the many contributing causes ignored. That the child is not digesting the proteids is evident, but careful examination of the milk does not disclose an amount of proteid above what a normal child can digest. Many of these children have an unstable nervous system which is intensified by the neurotic mother. The child and the mother react on each other with the result that the mother secretes an irregular supply of milk which upsets the digestion of the infant. These cases require study on the physician's part. Frequently every detail of their lives has to be gone into before the underlying cause can be discovered and removed. If the physician does not dominate the situation the ever present neighbour, who has seen similar cases do well on a bottle, will prevail, and weaning will be instituted. This is the

commonest type for which advice is asked and these are cases in which mothers are frequently recommended to wean their infants. This plan seldom succeeds. On the contrary they should be referred to physicians who will take the trouble to prolong and improve the lactation period. These nervous women must be kept from worry and excitement and taught to live rational lives.

Four methods of increasing breast milk have been used: drugs, diet, massage and expression. Numbers of drugs have been used for the purpose, but each in turn has been discarded. The latest substances employed as galactogogues have been glandular extracts, but the results obtained have not been encouraging. Morse and Talbot sum up the evidence of any galactagogue action thus far obtained by saying, "There are no drugs, which, whether taken internally or applied externally, can increase the flow of milk to an appreciable extent."

The best diet for a nursing mother has been a very much discussed point. The mother has to have an additional seven to eight hundred calories to make up for those lost in the milk. She also requires an extra fifteen to thirty ounces of fluid. Hoobler, in a series of careful experiments, found that a woman does best on twenty-six to twenty-nine hundred calories. He found that either animal or nut protein was essential. To protect the maternal tissue the nutritive ratio of proteids to carbohydrates and fats should be at least one to six. He found milk protein the best one to produce milk and conserve the maternal tissues.

McCollum demonstrated in rats that the mammary gland can pick out the necessary amino-acids, the fat soluble A. and the water soluble B. vitamins from the blood, but considers that it has no synthetic power.

Most authorities agree that a generous mixed diet is essential. Depriving a woman of things she likes, if they are nutritous and digestible, is no longer deemed desirable. Provided her digestion is in good order there is no single thing forbidden. It is also no longer considered essential to consume large quantities of milk, soups, and gruels. In fact a large quantity of these fluids may do more harm than good.

The following is the diet Abt employs for his wet nurses. These women are nourishing their own baby and supplying an average of thirty-seven ounces per day for the hospital. 8 a.m., cereal, fruit, milk, rolls, cocoa or tea, eggs. 12 noon, soup, meat, potato and one green vegetable, cereal, pudding or ice cream and occasionally cookies. 6 p.m., meat, vegetables, cereal, stewed fruit and tea or milk.

Massage and electricity have been also tried. Both may have a psychotherapeutic effect. E. Truby King, of London, has been the most ardent advocate of this method of stimulation but recent reports indicate that he is adopting expression of the milk from the breast as a more satisfactory method. On this continent massage of the breast is not favoured and is generally condemned.

Sedgwick has elaborated a method of expressing the milk from the breasts which he has found satisfactory both for stimulating production and also for reinstating breast feeding. The breast is grasped one or two cm. back of the coloured areola and a milking motion is carried out toward the nipples. He has the baby nurse every four hours and follows the nursing by a milking of the breasts by hand. Any milk secured in this way is given to the infant in a bottle. If sufficient nourishment has not then been given a small supplemental feeding is supplied. He considers the substitution of a bottle feeding for a nursing a pernicious measure, because the breast is deprived of the stimulation so much needed in these cases where the supply is failing. He cites a case in which he brought back an abundance of milk after a child had been weaned for nine weeks owing to the serious illness of the mother.

The only absolute contraindication for nursing is tuberculosis in the mother. Should she have a severe illness or be suffering from some chronic wasting disease it may be considered unwise to attempt to nurse. Menstruation is not considered to have any permanent deleterious effect on the milk.

The prenatal preparation of the woman for nursing is not taken up as this important work belongs to the obstetrician. Closer co-operation between the latter and the pediatrist is essential.

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Men and Books

"For books are not absolutely dead things, but do contain a potency of life in them, to be as active as that soul was whose progeny they are; nay, they do preserve as in a vial the purest efficacy and extraction of that living intellect that made them."

JOHN MILTON—Areopagitica.

I

THIS section of the Journal was inaugurated by William Osler in January, 1912. It was literally his own department, containing articles by himself only, upon subjects culled from those quaint by-paths of medical biography in which he loved to wander, or upon current events of interest in the history of Medicine. For the time being it formed his whole contribution to Canadian Medicine and it came as his message to us here until sterner duties connected with the War necessitated its abandonment.

The quotation cited above was used by him to introduce his address "Books and Men" on the occasion of the opening of the Boston Medical Library in 1901. The spirit of a book is indeed that of the man who made it and it was out of his intense love for humanity that Osler himself loved books so well. In the revival of this department at the present time, his spirit is invoked to guide it, so that the ideals of work and service that live in his pages may be furthered here.

The following titles taken at random from some of the Journal files, show the trend of these delightful little communications from him, which might have been described as an overflow from his rich experience in the favorite avocation of his life: Dr. Slop; John Shaw Billings; Aristotle; Gomperz' Greek Thinkers, Volume 4; Robert Fletcher; The Young Lænnec; Mediæval Medicine; William Beaumont; The Works of John Caius, M.D.; Gui Patin; George Bodington; Histoire de la Charité; The Funeral of Lord Lister, etc.

The following account of a meeting recently held under the auspices of the Montreal Medico-Chirurgical Society at which papers were read on the early life of Sir William Osler, is presented here with the thought that it may serve as a fitting introduction to what we venture to hope may again become a live department.

The proceedings were opened by the President, Dr. W. W. Chipman, in the following words:

"We are to devote this evening to the memory of the late Sir William Osler, to a study of his earlier life and work. We are indeed fortunate in that this study is to be presented to us by his nephew, Dr. Norman Gwyn, and by his old friend and associate, Dr. Francis J. Shepherd. For the one, himself a distinguished physician, enjoys the bond of a close kinship, while the other, known the world over as an Anatomist and Surgeon, was perhaps his most intimate friend.

It is wise to recall to ourselves the lives of our distinguished men, for so only can we profit from their example and gain wisdom and inspiration from their experience. A prophet should be always a prophet *first* in his own country. And so much the worse for his own country if he is not. Sir William Osler was truly one of ourselves. The earlier years of his busy working life he spent in this community; and through all the after distinguished years, he never forgot us. During his sojourn here he was an active Member of this Society, and many of his first contributions to the Science and Art of Medicine were made to it. He has been, perhaps, the most illustrious member of the Montreal Medico-Chirurgical Society.

We meet to-night within the precincts of his old university. The walls are new, but it is his old school. In the adjoining museum are to be found many of his earlier pathological specimens, while the library has been already enriched by his numerous gifts. As you know, his complete library is bequeathed as a special legacy to us, and in due time his ashes are to repose here.

It is well that we, as a society, should devote this time to the recollection and the study of the life and work of this great man. For us he will always be the greater, inasmuch as he was throughout his life one of ourselves."

Dr. Norman B. Gwyn, of Toronto, opened an illustrated address on Sir William Osler's early life by expressing his feeling, which was an emotion deeper than pleasure, in addressing the society on this subject within the school that graduated Osler, which must always be in this relation to the student of medicine holy ground. A feeling of reverence should not, however, overcast the proper outlining of a very human character, one like that of most other normal men in their youth, save in the possession of an unusual charm, and in having an initiation and foresight uncommonly developed. He divided his subject into four parts:

1. *Heredity and training.* A survey of the influences bearing upon the development of the man showed in the first place a remarkable inheritance evidenced in the preceding generation by a turning

away from the ancestral calling of commerce and shipping to scientific and literary activities of a really high order. This bent was especially marked in his father, the Reverend Featherston Osler, a truly extraordinary man, who, at the age of twenty-five, after thirteen years in the Royal Navy, commenced the study of Theology, and after nearly seven years spent at Cambridge in getting an M.A. and reaching a deacon's status, forsook the hope of a comfortable English living for pioneer missionary work in Canada, and came with his young wife to that part of Ontario situated on the old Penetang Road, which was the seat of active colonial extension at that time. The family was well established and the early hardships over when, thirteen years after their arrival in Canada, Sir William was born, at the old Bondhead Parsonage, on July 12th, 1849. In his ninth year the father, Featherston Osler, was removed (at his own request and for the education of his sons) to Dundas, where he remained stationed for the remainder of his life. Here the boys came under the eye and hand of King, head of the justly celebrated Dundas Grammar School, and a settled social existence superseded the rougher Bondhead life; the Rectory became now the typical quiet English home, "a gardener's pride", and the conditions of home duties in a large family circle, and hearty boyish activities and the acquirement of numerous friendships and interests, filled seven singularly happy years, passed too under the close home-training and judicious discipline tempered with affection of a remarkable mother, whose influence remained paramount throughout his life.

2. *The man and the opportunity.* An amazing chance brought Osler as a schoolboy into close personal contact with a group of naturalists, and especially with one man among them who may justly be considered among the chief compelling influences of his life. At the age of sixteen he was sent to Trinity College School, where, waiting to receive and lead him, was Johnson, "priest of the parish of Weston", "a man of the White of Selborne type" who knew Nature intimately and knew too, how to interest his boys in her. Closely in touch too with the school, possibly Johnson's teacher in Natural Science, and certainly his co-worker in this field, was another oncoming influence, James Bovell. The quiet development of Osler's interest in Natural History and Zoology, an interest gradually increasing to enthusiasm under the free use of the microscope and the active guidance and co-operation of his seniors, was the deep underlying feature of the Weston life.

3. *Adolescence.* In the fall of 1867, Osler left Weston for Trinity University, entering as a student in the academic department preparatory to taking up the studies in divinity towards which his intimacy with Johnson had evidently directed him. Of his progress in Theology at the University we know nothing, but the effect of this specialized directly classical teaching is seen in all his writings. Bovell was the professor of Physiology and Chemistry, and the giver of lectures on "Physiology in its relation to Natural Theology". Osler's subsequent transition to medical studies was merely a move into another realm where his master reigned supreme, and in 1868 he entered the Toronto school of Medicine and began those fifty-two years of uninterrupted productive activities which have so materially influenced the Medicine of the world. In 1870 Bovell was gone, and the influence that to Osler had been the leading kindly light for years was no longer there to be looked to, and so the temptation towards the then better hospital facilities in Montreal met with no resistance.

4. *An idea and its cultivation.* Osler owed much of his progress and development to the cultivation, from his earliest days of an idea that was revolutionary, in the sense that it was original with himself, in regard to the method of approaching one's life work: the Conservation of Time; this idea produced, through his teaching and example, the modern system of developing medical teachers and consultants. It may actually be called *The Osler System.*

A note-book of Dr. Johnson's, in which was recorded the receipt of specimens for microscopic study from Osler while yet a schoolboy, was exhibited.

Dr. F. J. Shepherd then spoke upon Osler's Montreal period from his graduation in 1872 to his departure for Philadelphia in 1884. A tribute was paid to the late Sir William Dawson, the then principal, who had "built up the university from a very small affair"; to Dr. G. W. Campbell, then Dean of the Faculty, and a man of strong personality and great surgical reputation; and to Dr. R. Palmer Howard—accounted the third great influence in Osler's life,—whom he described as an earnest, enthusiastic, highly competent clinical teacher with a deep interest in pathological anatomy and a wide knowledge of contemporary literature, who quickly recognized Osler's capacity and moved everything to give him the opportunities and equipment he required.

Coming to the subject of Dr. Osler himself, during these years, Dr. Shepherd dwelt with affection upon his personal charm, which endeared him to all his Associates, and his inextinguishable sense of fun; his power as an observer and his rank as a great clinical teacher, whose contribution to Medicine was the introduction of bedside teaching on this continent; his remarkable literary productivity and the stimulus and inspiration he brought to the Medical Societies and Journalism of the time, especially also to the men younger than himself by whom he was even then surrounded.—"When he left us, the light seemed to have suddenly gone out."

Dr. Lawrence J. Rhea, then spoke as follows:

"We have been very much interested in all Dr. Gwyn has told us about the early life of Sir William

Osler, which might be referred to as his first formative period. A period, which under the influence of such an excellent teacher, and broad-minded man as Dr. Johnson, might have formed the basis for a life devoted either to the arts of the sciences. Fortunately for us, in the case of Sir William, both the arts and the sciences were keenly appreciated and understood.

His career is of interest to any one who takes life seriously, but especially to Pathologists, first because Pathology did a great deal for Sir William, and next because Sir William did a great deal for Pathology. He, more than any man that I have known, had the ability to look beyond the gross and even the detail of pathological lesions, and apply them to the living. Thus, however great his interest was in disease—as, for instance, in one of his pet diseases, aortic aneurism—however much he understood and appreciated the basic lesion that led to the gradual dilatation of the aorta, the formation of the laminated clot and the anatomical changes that might take place in this condition, he saw far beyond these; they meant to him also a brassy cough, a tracheal tug, a contracted pupil, and the excruciating pain to the patient that is associated with erosion of the vertebræ. His interest was in unfortunate and suffering humanity, and he used Pathology as well as all the other branches of medicine in the interpretation of clinical signs and symptoms, the prognosis and treatment of disease. The memory of Sir William will always be very dear to us, because he was a personal friend to many of us, a teacher of us all, and he upheld real ideals in life."

An exhibition of the large Osler Pathological Collection, consisting of some one hundred and fifty specimens placed in the Museum of the Medical Faculty by Dr. Osler himself during his term as Pathologist to the Montreal General Hospital from 1877 to 1884, and which were of great interest as having nearly all been made by him, and a historical exhibit of rare first editions, diplomas, etc., presented by him during his life time to the McGill Medical Library, were demonstrated at the close of the meeting by Drs. Maude E. Abbott and C. F. Wylde.

M. E. A.
H. P. W.

Obituary

DR. JOHN PHELAN MACDONALD

John Phelan MacDonald died suddenly at the S. C. R. Hospital, Edmonton. His death was due to pulmonary embolism arising from phlebitis following an operation on his foot. Dr. MacDonald graduated from McGill University in 1905 and afterwards studied in Edinburgh and Glasgow, and took some special post-graduate work in Harvard. He took up practice in Edmonton in 1909, where he was very successful. In November, 1915, he enlisted for War service and went overseas, where he became attached to the R.A.M.C. and served in the 58th Scottish General Hospital, and afterwards at the front with the 55th Lancashire Regiment. After the Armistice he remained six months serving with the army of occupation in Germany. His faithful and self-sacrificing devotion to duty appeared to have lowered his vitality and indirectly led to his death.

DR. JOHN CALVIN LITTLE

Dr. John Calvin Little, of Killarney, died suddenly of heart failure while on a visit at the Royal Alexandria Hotel in Winnipeg. He came west to Manitoba in 1903, and after becoming a member of the College of Physicians and Surgeons of that province, he took up practice in Alexander for a few years, but afterwards moved to Killarney, where his brilliant personality won for him many personal friends, and an enviable practice. His sudden death is deeply regretted by all who knew him.

Abstracts from Current Literature

SURGERY

Observations on Empyema. ASHURST, A. P. C.: *Annals of Surgery*, 1920, Vol. LXXII, p. 12.

ASHURST tabulates the opinions expressed by his father twenty-six years ago regarding the indications for and the methods of operating upon empyema. He believes that for the most part, the advice offered at that time still holds good. His conclusions summarized are as follows: If massive purulent effusion is present most of the fluid should be removed by aspiration one or two days before thoracotomy is undertaken. Thoracotomy may usually be postponed in cases of seropurulent effusion until frank pus is obtained. Exploratory thoracotomy should be undertaken if pus is suspected and the symptoms urgent even though no pus can be found by needle. Thoracotomy for empyema should be performed under local anæsthesia and should provide free and dependent drainage by the resection of a rib. Post-operative irrigations are usually unnecessary. If healing does not take place after several months, Dakin's solution or Beck's paste may effect closure. If not, major operative interference, decortication, or decortication plus collapse of chest may be necessary. The average period among the author's patients before closure took place was seven weeks. F. B. GURD.

Empyema—A Syllabus of Operative Treatment. LILIENTHAL, H.: *Annals of Surgery*, 1920, Vol. LXXI, p. 87.

LILIENTHAL believes that when empyema cavities are single and simple, they should be treated by ordinary drainage, with subsequent disinfection by Dakin's solution. The more complicated cases require exploration with simplification of the cavity and mobilization of the lung. Chronic empyema with sinus demands non-collapsing thoracoplasty. F. B. G.

Operation for Empyema in Young Adults. BUNTS, F. E.: *Annals of Surgery*, July, 1920, Vol. LXXII, p. 66.

BUNTS considers the *x*-ray more useful than the needle in localizing an empyema. With bacteria present in the effusion but no pus, a two per cent. solution of formalin in glycerine is injected after aspiration. Seven out of sixteen cases were cured.

With both bacteria and pus present, operation is performed within twenty-four hours unless pneumonia be present. General anæsthesia is the rule. Rib resection is performed, a tube sutured tightly in position and clamped. The clamp is opened at half hourly intervals until the chest is evacuated. After ten days the chest is washed out twice daily. Blowing bottles and exercises are employed, with fresh air and forced feeding. F. B. G.

The Treatment of Chronic Empyema. TUFFIER, T.: *Annals of Surgery*, September, 1920, Vol. LXXII, p. 266.

IN the treatment of acute empyemata, Tuffier employs the Depage-Tuffier method. This consists of discontinuous irrigations by Dakin's solution through carefully placed Carrel tubes in all corners of the cavity. If a broncho-pleural fistula exists, oxygen is substituted for Dakin's solution. When the culture curve reaches zero and a dry compress placed over the opening remains dry for twenty-four hours, surgical closure is brought about. By this method an aseptic pneumothorax is formed.

Four of the acute cases became chronic, the cause being either pleural diverticula or bronchial fistula. Whatever the cause of chronicity it requires a long and difficult treatment.

The operation of Estlander is ill-advised. "Our object is precisely the contrary." It consists in every case where possible in removing the pleural shell to permit the lung to return to its proper position in the thoracic cage. Treatment is preceded by careful radiologic and bacteriologic examination, and the use of the pleuroscope.

Disinfection is attempted; if found impossible decortication complete or partial is undertaken. Tuffier states that costal resection should be reduced to a minimum. Closure of the surgical incision and pleural decortication should be preceded by disinfection of the cavity and they then give success which was formerly unknown.

This article is well illustrated and includes a statistical table of cases. F. B. G.

The Treatment of Chronic Empyema. HEDBLOM, C. A.: *Annals of Surgery*, September, 1920, Vol. LXXII, p. 288.

HEDBLOM'S article is of greatest interest on account of the completeness of its bibliography (one hundred and sixty-three references) and the historical review

of methods of treating thoracic empyema from the time of Hippocrates who taught that the pus should be evacuated by either cautery or knife. Estlander in 1879 recommended the removal of a sufficient number of ribs to completely unroof the cavity in cases that were chronic. Schede in 1890 described the extensive resection that bears his name. In 1892 Delorme enunciated a new principle in the treatment of chronic empyema cavities; namely, that of their obliteration by re-expansion of the lungs. About the same time, 1893, Fowler employed this method. To the former belongs the credit of having first enunciated the principle and to Fowler of having first performed the operation. Since this time the method of rib-spreading designed to conserve the chest wall has been developed. The plastic methods of Robinson and Beck have been useful in certain cases. In Hedblom's opinion a major procedure is indicated only when non-operative or less extensive surgical treatment may reasonably be considered less effective. In case of sinuses and small cavities, adequate drainage is usually sufficient to effect a cure with or without a short preliminary hypochlorite treatment. Dakin's hypochlorite solution is the method of choice in the treatment of the ordinary type of chronic cavity. A pulmonary decortication, through a rib-spreading exposure after a preliminary hypochlorite solution irrigation, is the most conservative treatment for cavities that are not obliterated by drainage or by treatment with Dakin's solution. If the lung does not expand, a plastic operation is indicated. If the patient is debilitated this should be done in two or three stages. A tuberculous empyema not secondarily infected should not be drained. Operative closure of bronchial fistulæ that persist is necessary to complete healing. This may be accomplished by decortication of the involved portion of the lung, with cautery, suture or skin plastic operation.

F. B. G.

Suture of the Patella. DESFOSSES, P.: *La Presse Médicale*, November 13th, 1920.

THE author in discussing poor results following operations for fracture of the patella emphasizes the fact that the highest success is obtained, not by hit-or-miss methods of fixation of the fragments, but by a most careful and accurate co-aptation of the bony surfaces torn apart by the trauma, without allowing any shreds of fibrous tissue or a dead space to intervene. He emphasizes too, the importance of forcing together the fragments by strong forceps preparatory to the fixation. While apparently preferring catgut, he regards the choice of suture material as of secondary importance. Surgery of bone, he concludes, is a surgery of precision, which suffers from the "almost", and is not for the surgeon who is always pressed for time.

F. J. TEES.

Surgical Treatment of Simple Fracture of the Olecranon by Suture of the Aponeurosis. CHALIER, A. AND VERGNORY, M.: *Lyon Chirurgical*, May-June, 1920, Vol. XVII.

THE authors report in detail three excellent results obtained in simple fracture of the olecranon by suture of the aponeurosis on the analogy of fractures of the patella sutured in a manner corresponding. They advocate this procedure with two reservations—firstly, in fractures of the tip of the olecranon, where the main triceps insertion is not disturbed, cases which respond to simpler methods; and secondly, transverse fractures with wide displacement in very muscular subjects, where a method of bone fixation is indicated. A posterior longitudinal incision is made, clots are removed from the joint cavity, fibrous tags interposed between the fragments are excised, and with the elbow in full extension the fascial sheaths are sutured with catgut as conditions permit. The elbow is fixed in extension for a fortnight after which passive and active movements are undertaken.

F. J. T.

Reduction of Old Dislocation of the Hip by Open Incision. BUCHANAN, J. J.: *Surg. Gyn. and Obstet.*, November, 1920.

CASE report of hip dislocation (dorsal) of seven months standing in a young man of nineteen, due to severe trauma. Fracture of pelvis and of femur had also resulted from the accident.

Treatment. Preliminary traction by Buck's extension to thigh only, by which half an inch in length of leg was gained. Kocher incision used, acetabulum found filled with dense connective tissue and shreds of capsule. After freeing the head, reduction was effected by manipulation and by the use of levers used on the head as a shoe-horn. Considerable shock ensued. The result was a solid and painless gait, and patient was able to work as an automobile repairman.

The writer considers that traumatic hip dislocations may be considered as "old", and hence as unsuitable for reduction by manipulation, after four weeks.

A report of five cases in the literature is appended.

J. A. NUTTER.

Operative Treatment of Old Hip Disease. ROGERS, M. AND PEABODY, W. C.: *Jour. Orthopæd. Surg.*, November, 1920.

THE authors consider that in the first group of cases of old hip disease, namely, those with deformity and firm ankylosis whether bony or fibrous, the treatment has been standardized (osteotomy at or near the great trochanter with correction of the deformity).

The paper considers mainly the treatment of a second group, and it comprises cases showing hip deformity with movement, a portion of the head being left in the acetabulum. This movement in the damaged joint is thought to be the chief cause of the so-called

recurrence of symptoms (pain and disability). Here osteotomy is not to be advised on account of the danger of the deformity recurring, and because, not producing ankylosis, it does not prevent the pain due to muscular and ligamentous strain.

Hence an arthrodesis of the damaged joint is indicated, at the same time correcting the deformity. This is now done by the Smith-Petersen approach, the acetabulum and femoral head being rawed and fixed in absolute apposition. Necrotic and even purulent debris may be found and removed, though no attempt is made to remove all pathological material. Fixation is by plaster spica.

A third group, where there is pathological dislocation and absorption of the head, presents a much more difficult problem. Here an attempt is made to place the top of the trochanter in the acetabulum with the leg in abduction, making as stable a joint as possible.

J. A. N.

A Case of Congenital Atrophy of the Femur. GRANJOUX, E. AND PECHERAL, C.: *Revue d'Orthopedie*, September, 1920.

THE authors report a case of atrophy of the upper half of the femur in a baby, the shaft tapering off above with neither neck nor small trochanter. No cause could be assigned. The relationship of this deformity to congenital hip dislocation is discussed.

J. A. N.

Permanent Thigh Flexion due to Muscular Anomalies FAUTELAIS, P.: *Revue d'Orthopedie*, September, 1920.

THE writer reports the case of a child with permanently flexed hips, although the hip joints appeared normal. The cause of the deformity, which was of such extent (90° flexion) as to prevent walking, was found to be dense fibrous bands on either side extending from the iliac crests to the sides of the thighs in the track of the tensor fasciæ femoris. These dense bands were cut through by open incision and the thighs allowed normal extension. This condition was thought to be caused by the wearing of a very tight abdominal bandage by the mother during pregnancy, to overcome weakness of the abdominal muscles. J. A. N.

Flail Shoulder. ULRICH, F. F. A.: *Brit. Jour. of Surg.*, July, 1920.

THIS paper contains the report of a case of compound comminuted fracture of the head and neck of the humerus, by a shell fragment, with destruction of the deltoid muscle and soft tissues; and fracture of the glenoid fossa and spine of scapula. Wide excision of head and neck of the humerus, with the injured soft tissues, left a flail shoulder in every sense of the word. Both deltoid muscle and circumflex nerve were destroyed, the other nerves being intact. After clearing up sepsis, a six inch tibial bone graft was driven into a tunnel made in the remains of the glenoid fossa, the other end being driven into the medullary canal of the humerus. Previous to this all scar tissue had been removed and the bone ends freshened. The graft was introduced with the upper arm at an angle of 80° abduction from the trunk, and 25° anterior to the coronal plane of body. Some wire was used, attaching glenoid to humerus, but this had to be removed after three weeks owing to persistent sinus. Immobilization for four and one half months gave good bony union, a very useful arm being obtained.

There were three and one half inches of shortening of the arm. There is little doubt but that the bone graft was responsible for the bony union. A very interesting and instructive case. J. A. N.

Sacro-Iliac Sciatica. BARRY, J. A. and DUPREY, P. LEMAUSOIS: *Revue de Medecine*, 1920, No. 1.

THE authors, who are neurologists, in a very excellent article describe the symptom complex "sacro-iliac sciatica", or sciatic pain symptomatic of sacro-iliac disease or injury. The curious point is noted that such sciatica is to be differentiated from ordinary sciatica. Evidently the writers do not agree with the modern view that practically all sciatic pain is secondary to some primary lesion most commonly arising from bone or joint, for example, rheumatoid arthritis of the lumbar spine. It is interesting to note with what persistence neurologists cling to the now discredited doctrine of a primary sciatic neuritis.

Sacro-iliac lesions mentioned as causing sciatic pain are strain, rheumatism, tuberculosis, and suppurative conditions. The use of a sacro-iliac support is recommended.

One of the most interesting features of the article is the anatomical explanation of the path of pain referred from the sacro-iliac joint along the obturator, external cutaneous and anterior crural nerves as well as the great sciatic. J. A. N.

The Treatment of Scoliosis by a Modification of the Abbott Corset. BROCA, A. AND HONDRE M.: *Revue d' Orthopedie*, September, 1920.

THERE is little in this paper to remind the reader of the Abbott method of treating scoliosis. The jackets are put on under suspension, an effort is made to reduce the prominent ribs by the introduction of increasing thicknesses of felt pads, and the hollow side of the chest is encouraged to expand by blowing water out of a bottle. After three plaster corsets a cloth corset with lateral steels is used. Good results are claimed. J. A. N.

On Osteo-Synthesis in the Treatment of Pott's Disease. CALVE, J. AND SOLLAND, M.: *Revue de Chirurgie*, Paris, 1920, No. 5.

THE authors in a lengthy and well illustrated article

have much to say in criticism of the methods of Albee and Hibbs in the treatment of Pott's disease. They suggest the use of a short rather than of a long graft, applied early in the disease, limited strictly to the diseased vertebræ, and accompanied and followed by the classical treatment of rest with the spine hyperextended. Their operative technique involves, first the removal of the entire spinous processes and then the formation of a suitable bed for a tibial graft by chiselling outwards the laminar surfaces.

This new method of making a bed for the bone graft appeals to the reviewer more than does the theory of treatment on which the article is based.

J. A. N.

A Study of Persistent Bone Sinuses. PEABODY C. W.: *Surg. Gyn. and Obstet.*, November, 1920.

THIS paper is really the study of the treatment of an infected bone cavity, the resistance to cure of which is well known. The method evolved by the writer, that of extremely radical ablation, by which the disease and its maintaining causes are removed, followed by the application of the Carrel-Dakin technique to prevent reinfection of the newly exposed surfaces and to permit later closures by plastic operation or simple secondary suture, was first advocated by Jacob of Belgium in 1917, and has since been frequently emphasized by Chutro of Argentine. The writer shows a very high percentage of clinical cures, but considers that more time must elapse before it can be definitely shown that these cures are permanent. A very interesting and instructive paper. J. A. N.

Contribution to Bone Transplantation. LERICHE, R. AND POLICARD: *Lyon Chirurgical*, July-August, 1920.

THE authors insist that the so-called bone graft dies, and is therefore not really a bone graft. After being transplanted and dying, it may be (1) eliminated or expelled, as generally follows in the presence of infection, (2) tolerated by the tissues without being attacked, or (3) absorbed.

As a rule tolerance is a transitory state followed after twenty to thirty days by beginning absorption of the graft. The first phenomenon of absorption is the revascularization of the Haversian canals of the transplant from the vascular connective tissue of the host. Without this the graft does not "take" and to obtain this the graft should be in intimate contact over all of the surface at its extremities with well vascularized and not too dense bony tissue.

The bone graft is regenerated by reconstruction of the Haversian system, which has at first been destroyed. The endosteum plays no special part in the reconstruction. Early resumption of walking with the help of an ambulatory brace is recommended, movement being the best stimulus to reconstruction, once it is determined that absorption of the graft has begun, as shown by its increasing fixity. The author's best cases began to walk one month after the graft has been inserted.

Metallic fixation of the graft is not advocated, and scrupulous hemostasis is insisted upon.

A very well written article, and one that details a knowledge of the later developments in bone graft surgery. J. A. N.

The Pathology of the Renal Pelvis in Two Cases Showing Hæmaturia of the So-Called Essential Type. QUINBY, W. C.: *Jour. of Urology*, 1920, Vol. IV, p. 209.

THIS article is based on the careful pathological examination of two kidneys which were removed for profuse hæmaturia in which diagnosis was made of "so-called essential hæmaturia".

While the cause for the bleeding in both cases was not clear, the site of the hæmorrhage was located just under the epithelium of the pelvis, and to a less extent, in the substance of the papilla. The pathologist could not ascertain whether the condition had been caused by soluble toxins choosing these areas of the kidney as their point of elective action, or whether it was due to bacterial infection. The author recites the fact that renal hæmorrhage in small pox originates not infrequently just in this area, in which case, the causative agent is presumably a toxin.

These findings would explain the beneficial action of pelvic lavage with silver nitrate solution, with a view to causing a definite chemical reaction. In view of the location of the source of the bleeding, such a procedure as nephrotomy would be ill advised, and certainly only after more conservative non-operative measures had been tried. F. S. PATCH.

Treatment of Essential Renal Hæmaturia by Intrapelvic Injections of Silver Nitrate. RYTINA, A. G.: *Jour. of Urology*, 1920, Vol. IV, p. 317.

THE author recommends that after exclusion of all other causes of hæmaturia by all the diagnostic methods available, before resorting to radical or surgical treatment, that conservative, non-operative measures be tried.

He has had considerable success in three cases of hæmaturia treated after the method first used by Geraghty, which consists in an intrapelvic injection of silver nitrate, 4 to 8 c.c. of a 5 per cent. solution. The injection may have to be repeated after a longer or shorter interval, should the hæmaturia recur.

The author is of the opinion that a localized nephritis will be found more often than any other to be the cause of essential hæmaturia. It is important that thorough urological examination be carried out in

order to eliminate, as far as possible, the presence of stone, tumour or tuberculosis from the bleeding side.

The explanation for the therapeutic value of this procedure is not known, unless it be the pronounced reaction that results in the kidney pelvis and kidney substance. F. S. P.

Renal Hæmaturia—A Prenephritic Symptom. YOUNG, ED., L.: *Surg. Gynæ. and Obst.*, November, 1920, Vol. XXXI, p. 478.

ATTENTION is called to hæmaturia, a symptom which not infrequently is found in a prenephritic stage, nearly always unilateral and very often associated with renal colic. The establishment or exclusion of a primary focus of infection which is extra-renal is essential. The removal of such foci may prevent the onset of nephritis. Dr. Young calls attention to elimination of pus forming organisms from the kidney without damage to renal tissue. Treatment has called for nephrectomy in case of severe hæmorrhage, or nephrotomy and decapsulation. He notes the absence of any pathological lesion in many of these cases or of any signs of chronic nephritis. In the cases operated upon, about one-half were apparently cured. The others recurred and later developed frank clinical evidence of chronic nephritis. R. E. POWELL.

Occluded Renal Tuberculosis. BRAASCH, W. F.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1307.

THE author points out the frequency with which occluded renal tuberculosis is met with and that ureteral stricture of a tuberculous nature is the cause of about 10 per cent. of all renal tuberculosis which is occluded.

He points out the long duration of more or less mild symptoms averaging six and one-half years and the absence of gross findings in the urine, many being normal. In only 15 per cent. were the tubercle bacilli demonstrated in the urine.

Routine *x*-ray is very useful as an aid to diagnosis. The usual symptoms are frequency, dull pain, or abdominal tumour, usually extending over a period of years.

The kidney may be a focus of infection if recently occluded. If occlusion has been present for years, it usually becomes sterile.

If tumour, frequency or pain exists, nephrectomy is indicated, usually with excellent results. R. E. P.

Riedel's Lobe of the Liver Complicating Urological Diagnosis. O'CONNOR, V. J.: *Jour. of Urology*, 1920, Vol. IV, p. 97.

THE author reports two cases in women in which the presence of Riedel's lobe presented extreme difficulties in urological diagnosis.

Riedel's lobe or linguiform lobulation, is merely a prolongation of the right lobe; it is not necessarily associated with gall bladder disease and occurs most frequently in women. Its development is difficult to explain, but it would seem to occur as an anatomical abnormality, or it may be acquired through conditions tending to force the anterior margin of the right lobe of the liver downward.

It makes diagnosis difficult, particularly in cases in which it is associated with infection of the urinary tract. It may easily be mistaken for kidney or tumour. Pyelography will be of material assistance in the differential diagnosis.

(The new method of oxygen inflation of the peritoneal cavity should offer great aid in distinguishing this condition. The method is safe, and at times illuminating, and it should be used in all vague abdominal conditions.) F. S. P.

Abdominal Pain in Diseases of the Kidney and Ureter. CECIL, A. B.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV.

CECIL states that pain arising from diseases of the kidney and ureter is often purely abdominal in type. In a series of patients with stone in the kidney and ureter there was pain in every case; 28 per cent. of these presented abdominal pain only, and pain in the back was often associated with abdominal pain.

The confusing nature of abdominal pain was shown by the fact that in this series, 20 per cent. had undergone various surgical procedures for the relief of pain without a change in the symptoms. The position of the stone, whether in kidney or ureter had little bearing on the distribution of the pain. In renal tuberculosis the pain was less trying, never severe, with frequently no pain in the back or abdomen, while in pyelonephritis, abdominal pain was less frequent and less severe.

In hydronephrosis and hydro-ureter the pain was severe and led, in 30 per cent. of the series, to abdominal operations for the relief of the pain which later was shown to be renal in origin.

Other conditions giving rise to abdominal pain were tumours of the kidney, polycystic kidney, congenital malformations of the kidney and nephroptosis.

Those cases exhibiting abdominal distribution of pain are kidney and ureter stones and hydronephrosis. Routine urological examinations are impracticable but abdominal pain becomes a definite indication for complete urological examination when the urine shows abnormalities. M. D. LEVY.

The Treatment of Pyelitis in Infancy and Childhood. KRETSCHMER, H. L. AND HELMHOLZ, H. F.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1303.

THE authors recommend the use of the cystoscope and lavage of the renal pelvis with silver nitrate, one

half to one per cent. solution, and routine *x*-ray examinations to exclude calculus. The prevailing organism was found to be B. coli. They show cures in cases which had resisted all other methods of treatment. The paper was freely discussed and some rather strong criticisms offered against the routine cystoscopic examinations of infants and children suffering from infections of the kidney. R. E. P.

Renal Migration of Ureteral Calculus (case report). NEFF, J. H.: *Jour. of Urology*, 1920, Vol. IV, p. 111.

THE author reports a case of left ureteral calculus in a female which seems to have migrated from a position in the right ureter up to the kidney pelvis, whence it was removed by a pyelolithotomy. The patient had been observed carefully, and thorough examination, including control *x*-rays, made during the period of observation. The possibility of this occurrence must be borne in mind. It is due either to a dilatation of the ureter or reverse peristalsis. In the author's case, there had been a violent reaction to the first treatment and evidences of a periureteritis, which suggested a temporary complete occlusion of the ureter, naturally followed by ureteral dilatation above the site of occlusion. F. S. P.

The Treatment of Bladder Tumours. THOMAS, B. A.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1395.

THE article strongly urges the routine use of the cystoscope in every case of genito-urinary disturbance where there is any question of bladder disease. First, for diagnosis and treatment; second, to follow up results of treatment and diagnose early recurrence of tumour.

(1). A histopathological diagnosis should be made in all cases of bladder tumour. The treatment depends upon its character. In non-malignant types, polyp, papilloma, or hæmangioma, fulgurations either with the Oudin or D'Arsonval current, followed by radium needles (12·5 mg.) directly applied to site of tumour; occasionally cystotomy is necessary to remove blood clots.

(2). In selected cases of malignant tumours, especially those involving the vesical orifice, fulguration and radium are indicated with good temporary results, but insufficient time has elapsed to judge of superior lasting effects.

(3). In the case of malignant tumours favourably situated and not too far advanced, radical resection is indicated, supplemented by intense roentgen-ray crossfire.

(4). In the unfortunate group beyond hope of radical surgical interference, fulguration and radium may be tried. Very few of these cases are amenable to resection of bladder and transplantation of ureters. As a final measure, cystotomy and radical cauterization may be necessary to relieve retention and pain.

R. E. P.

The Surgical Treatment of Malignant Tumours of the Bladder. JUDD, E. S. AND SISTRUNK, W. E.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1401.

A SERIES of two hundred and two cases are reviewed. Attention is called to the frequent diagnosis of benign papilloma snippings where the bases are definitely malignant.

No strongly formed opinion is given of the success of radium treatment. Resection is advised in all cases of early malignant tumour, where the situation is favourable, as offering the patient the best chance of recovery. Fulguration is not markedly beneficial, and indeed has been found harmful in some cases.

R. E. P.

Infiltration Anæsthesia of the Internal Vesical Orifice for the Removal of Minor Obstructions: Presentation of a Cautery Pouch. CAULK, J. R.: *Jour. of Urology*, 1920, Vol. IV, p. 399.

INCREASING education of the general public is bringing to urologists cases of prostatic obstruction in their early stages, before any renal deterioration has taken place. These cases are not always amenable to radical operative measures. It has been found that from 14 to 20 per cent. of cases of prostatism are due to contracture of the vesical neck or so-called median bar formation. The Young's pouch has proved a very effective method of curing a large percentage of this type of obstruction, but many urologists have been deterred from its use through fear of hæmorrhage and absorption. Simpler methods, such as high frequency cauterization and ordinary cauterization have not been applicable or effective in the majority of these obstructions, as they do not remove sufficient tissue and the measure has to be repeated and is time consuming. The Chetwood galvano-cautery operation is a major procedure.

The author has modified Young's pouch by substituting for the knife blade an iridio-platinum blade, with which the part is burned through by a low electric heat. Hæmorrahge is prevented, the tissues are sealed and there is a marked freedom from absorptive effects and other complications.

In the author's hands, twenty of these operations have been performed with excellent success. The procedure may be performed under local anæsthesia, the author having designed a special syringe for infiltrating the tissue of the vesical orifice with novocain.

F. S. P.

A Suprapubic Prostatic Retractor. FARR, R. E.: *Surg. Gynæ. and Obstr.*, November, 1920, Vol. XXXI, p. 532.

THE author describes a prostatic retractor as an aid in doing suprapubic prostatectomy, thus eliminating the dangers of infection made possible by using a finger in the rectum to elevate the gland during enucleation. He also claims that the operation can be done more readily under local anæsthesia or under a much lighter general narcosis. R. E. P.

A Procedure for the Cure of Prostatic Abscesses. STEVENS, A. R.: *Jour. of Urology*, 1920, Vol. IV, p. 249.

THE author has made a study of various procedures for the treatment of prostatic abscess, particularly with a view to lessening the time of convalescence and stay in hospital.

He had previously tried various operations:

a. Drainage into the posterior urethra, (1) through a suprapubic intravesical approach, or (2) through a perineal incision opening into the membranous or the bulbous urethra;

b. Drainage into the rectum in selected cases;

c. Drainage into the perineal space through the posterior prostatic capsule, after careful dissection between the prostate and the anterior rectal wall.

The suprapubic approach was abandoned on account of the lengthy time of healing and the resulting weakened abdominal wall.

Perineal drainage through the opening of the abscess into the posterior urethra was unsatisfactory, chiefly because of the prolonged convalescence.

Drainage through the posterior capsule of the prostate, without opening the urethra has apparently been done at the Bellevue Hospital only occasionally, and with unsatisfactory results.

The author has recently employed the methods of aspiration through a needle plunged into the perineum, and opening of the abscess into the posterior urethra by a metal sound. The latter is the one preferred on account of the good results obtained.

It consists in the introduction of a rather pointed sound, with a small curve (Fr. 23) into the urethra. The patient is in the lithotomy position, under gas and oxygen anæsthesia. One finger in the rectum locates the tip of the sound at the apex of the prostate. The sound is introduced about 2 cm. further, turned 90 degrees and with care forced through the lateral wall of the urethra into the corresponding lateral lobe of the prostate. The procedure is then repeated on the opposite lateral aspect of the prostate. Slight pressure on the prostate at this stage usually produces a copious purulent discharge at the meatus. The urethra and bladder are irrigated until clean; no catheter is left in the urethra.

Eight patients have been treated by this procedure; in all but one instance gross pus was discharged at the urethral meatus after the sound operation. In no case was there more than trivial hæmorrhage. The average stay of this group of patients in hospital after the sound operation was six days, whereas in fifteen consecutive perineal sections for drainage of prostatic abscess into the posterior urethra performed during the year previous to this work, the average stay in hospital after operation was thirty-one days.

F. S. PATCH.

Spinal Anæsthesia in Urology. SMITH, G. G.: *Jour. of Urology*, 1920, Vol. IV, p. 237.

THE author strongly urges the use of spinal anæsthesia for urological operations on the lower urinary tract, particularly in patients with poor heart or kidneys, or any other condition in which ether anæsthesia is attended by risk. He uses the method in almost every prostatectomy, in cases of retention due to stricture, in cystoscopy with irritable bladders, particularly in tuberculosis, where otherwise urethral catheterization would be difficult.

The author uses a 5 per cent. solution of novocain, the total amount injected being 2 c.c., the content of novocain being ·05 gram, the patient being given a small hypodermic injection of morphia, one-half hour before operation. The injection is made between the second and third lumbar spines, the patient being in a sitting position. The specific gravity of the solution used by him is 1007, which approximates very nearly to the specific gravity of the cerebro-spinal fluid.

The author has been fortunate enough to have had no serious results with the method. Headaches do occur, and may be severe, but always disappear inside of two or three weeks. Vasomotor collapse is probably the real danger and is probably due neither to the toxicity of the drug, nor to paralysis of the vasomotor centre, but to a paralysis of the vasomotor fibres regulating the tone of the blood vessels in the splanchnic area, which are given off from the spinal cord from the second to the seventh dorsal segment.

Anæsthesia lasts for a period of one to two hours. It is accompanied by a marked flaccidity of the abdominal muscles, a condition which is most helpful in prostatectomy, or operations in which a relaxed lower abdominal wall is desired.

Nausea and vomiting sometimes occur, due to lowering of blood pressure by paralysis of the splanchnic roots. In such cases re-breathing is very efficient in stimulating respiration and thereby pumping the blood out of the large abdominal veins into the general circulation.

The method is valuable in that it enables the patient to take water immediately after operation, which is advantageous in patients with low renal function.

The author cautions that spinal anæsthesia should not be used when local anæsthesia will suffice, and concludes with the remark that the objections to spinal anæsthesia largely disappear with familiarity.

F. S. P.

The Treatment of Gonorrhœa of the Male Urethra. KEYES, E. L.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1325.

DR. KEYES strongly urges against over treatment and the use of strong injections. He recommends argyrol 10 per cent., as an anterior injection and acri-flavine, 1-5000 for irrigations.

He condemns the passing of instruments into an acutely inflammed urethra, but thinks sounds are of greatest value in breaking gonorrhœal nests in the chronic cases. He strongly recommends complement fixation as a test of cure, in addition to bacteriological tests, pointing out that the fixation remains positive in complicated cases long after the gonococcus is dead.

He finds no benefit in vaccines either in the acute or chronic stages and depends on immobilization in his treatment of gonorrhœal arthritis, in conjunction with ridding the patient of his local foci. R. E. P.

A Study of Mercury Injections by Means of the Roentgen Ray. COLE, H. N., LITTMAN, S. AND SOLLMANN, T.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1559.

THE authors have made a study of the rate of absorption of certain soluble and insoluble intramuscular mercury injections by means of *x*-ray examination. The only study previously made is that reported by Fournier that grey oil injections are absorbed by the fourth day after injection. These findings the authors were unable to confirm.

They found that mercuric salicylate had an average rate of absorption, when administered intragluteally, of four days; calomel of fifteen days and that grey oil remained unabsorbed during the entire period of observation, an average of forty-three days.

It would therefore appear that the dangers of cumulative poisoning are greatest with calomel and grey oil, and that from the slowness and irregularity of absorption, they are more likely to be inefficient.

Mercuric salicylate injections, in doses of one to two grains, particularly into the gluteal muscles, have a satisfactory rate of absorption and present relatively little danger. F. S. P.

Method of Treating Congenital Syphilis. FORDYCE, J. A. AND DOSEN, I.: *Jour. Amer. Med. Assoc.*, 1920, Vol. LXXV, p. 1385.

THE article reveals a clear and concise method of treatment of congenital syphilis using intramuscular injections of bichloride of mercury (made up in Palmatin to render it slowly soluble) and neo-arsphenamin.

Attention is called to erratic changes in the Wassermann reaction and its unreliability before the tenth day. A negative test may persist with active lesions.

The dosage of neoarsphenamin is well tolerated by infants. They show a table of doses using 0·075 grammes in infants from three to eight weeks; 0·1 grammes from two to six months; 0·15 grammes from six months to one year, and 0·15 to 0·2 grammes from one to two years. The dosage of bichloride being from 0.1 grammes in infants to two to three week increasing as child gets older. A child of two years will stand 0.25 grammes. They find serological cures in about one year after using about eighteen doses of neo-arsphenamin and twenty-four to thirty-two doses of mercury. R. E. POWELL.

Blood Transfusion. DURHAM, ROGER: *Long Island Med. Jour.*, October, 1920, Vol. XIV, p. 387.

THIS paper is a review of present day citrate and syringe cannulæ-valve methods. The sodium citrate method receives the endorsement of most workers who agree with the findings of the committee of the American Expeditionary Force (Crile, Boggs, Cannon, Moss, Vincent, Lee). This body endorses it for the army because of (1) Its simplest technique. (2) Simplest equipment. (3) It has given uniformly excellent results in a large number of cases and the presence of the citrate has resulted in no practical disadvantages.

It certainly produces a larger number of reactions especially with transfusions of large amounts of citrated blood. The toxic dose of citrate may be considered to be five grammes.

The author leans to the use of a modified Miller syringe cannula method which he does not describe.

C. K. P. HENRY.

Various Methods of Blood Transfusion, Applicable to Various Ages. STRAUSS, A. A.: *Surg. Clin. of Chicago*, November, 1920, Vol. IV, p. 987.

THE author uses two Luer glass syringes of 100 c.c. capacity. The veins of the donor and patient are dissected and cannulæ with stoppers are introduced. Sodium citrate in 2·0 per cent solution is freely used on the wounds and in the cannulæ and syringes. An adapter for the syringe to fit the cannula is employed and between syringe filling the stoppers plug the cannulæ.

He advises for infants the transfusion of 50 to 100 c.c. of blood into the superior longitudinal sinus, using the Braun needle which has a shoulder one eighth of an inch from the point. No preliminary

blood tests are needed in infants transfused from either parent.

In children under six years he advises dissection of the external jugular vein and gives 150 to 250 c.c.

C. K. P. H.

Injuries of the Heart and Blood Vessels. MAKINS, G. H.: *Brit. Jour. of Surg.*, July, 1920, Vol. VIII, p. 107.

THE article explains by text and drawings a series of unique specimens in the Museum of the Royal College of Surgeons of England. The illustrations, many of which are full page photographs of A. K. Maxwell's drawings, are beautiful examples of the best of the printer's art. Many cases are cited where death did not occur for hours or days after cardiac perforation. Foreign bodies in the cardiac chambers have been shown to travel to distal arteries; in one case the foreign body entered the posterior wall of the left ventricle and came to rest at the bifurcation of the left common iliac artery. In the section on vessel injuries a strange case is cited of aortic wounding by a piece of shell which perforated the stomach and was vomited. This man died on the fifth day after injury. Illustrations of bullets in the femoral artery and external iliac artery are shown, in the former the patient recovered after excision of the portion of penetrated artery. Cases of travelling bullets are cited; Captain Fry's case of a patient who lived one month after a bullet entered the left external iliac vein and came to rest in a branch of the left pulmonary artery! *Traumatic Aneurysms.* Several cases of arterial hæmatoma following wounds of the thoracic aorta, iliac artery, abdominal aorta and other vessels are shown. Arteriovenous aneurysms are illustrated. One case of false aneurysm of the thoracic aorta ulcerated into the œsophagus thirty-seven days after injury. The whole article is a wonderful résumé of injuries to the heart and larger blood vessels, and of value to those interested in vascular surgery.

C. K. P. H.

Unfiltered and Filtered X-Ray Dosage. WITHERBEE, W. D. AND REMER, J.: *Amer. Jour. of Roentgenology*, October 1920.

WITHERBEE and REMER contribute an article on *x*-ray dosage, submitting a series of formulæ for filtered and unfiltered rays. The standard of roentgen ray dosage is known as the "erythema dose", that is, the quantity of roentgen rays necessary to produce an erythema of the skin in from ten to fourteen days after exposure. This is greater than the epilatory dose, or the quantity of rays necessary to cause the hair to fall without erythema to be followed by complete regrowth of the hair. This smaller dose is spoken of as "one skin unit" and is equivalent to four Holzknecht. The four fundamental factors to be considered in *x*-ray dosage are: (1) The pressure or voltage expressed in kilovolts or in spark gap. (2) The quantity of current expressed in milliamperes. (3) The duration of the exposure expressed as time in minutes. (4) The distance from the centre of the target to the skin surface. The distance in inches between the spark gap terminals corresponds approximately to the number of kilovolts. The actual determination of the spark gap is just the amount of voltage that will give a spark across the terminals without the tendency to arc, and which, at the same time, maintains the milliamperes desired in the tube. The dosage necessary to produce one skin unit will depend upon whether the rays are filtered or unfiltered, and if filtered, upon the thickness of the filter and upon the material of the filter. The formulæ submitted for filtered rays are worked out with aluminum, varying in thickness from $\frac{1}{4}$ mm. to 7 mm. For unfiltered rays, the spark gap in inches multiplied by the milliamperes, multiplied by the duration of the exposure in minutes, divided by the distance of the target from the skin surface, squared, will determine the dose administered during an exposure. For filtered rays there is an important difference in the equation, namely, the spark gap multiplied by the milliamperes, multiplied by the time is divided by the distance only and not by the distance squared. The fraction obtained is then compared with the proper normal fraction and it will be seen readily whether the dose is greater or less than one skin unit. This is of value not only in treatment but also in radiography, for one can readily determine the number of exposures which may be made of a part with any technique without injury to the part.

The following are a few of the formulæ contained in the article:

1. *Unfiltered Rays.*

$$\frac{\text{3 inch spark gap} \times \text{3 milliamperes} \times \text{4 minutes}}{\text{8 inches} \times \text{8 inches}} = \frac{9}{16}$$

the normal fraction for one skin unit, equivalent to 4 Holzknecht. This will cause the hair to fall without erythema within ten to fourteen days, to be followed later by complete re-growth. The same fraction may be obtained with the following variations of the spark gap, milliamperes or time:

$$\frac{\text{6 inch spark gap} \times \text{3 milliamperes} \times \text{2 minutes}}{\text{8 inches} \times \text{8 inches}} = \frac{9}{16}$$

Here the spark gap is doubled and the time halved.

$$\frac{\text{3 inch spark gap} \times \text{6 milliamperes} \times \text{2 minutes}}{\text{8 inches} \times \text{8 inches}} = \frac{9}{16}$$

The milliamperage has been doubled and the time halved.

The standard formula for an erythema dose is 45/64 as follows:

$$\frac{\text{3 inch spark gap} \times \text{3 milliamperes} \times \text{5 minutes}}{\text{8 inches} \times \text{8 inches}} = \frac{45}{64}$$

2. *Filtered X-ray Dosage.*

Each thickness of aluminum requires a separate

standard or formula for one skin unit. Three examples are given below:

1 mm. Aluminum.

$$\frac{\text{9 inch spark gap x 5 milliamperes x 1 m. 54 s.}}{\text{10 inches}} = \frac{171}{20}$$

3 mm. Aluminum

$$\frac{\text{9 inch spark gap x 5 milliamperes x 2 m. 34 s.}}{\text{10 inches}} = \frac{231}{20}$$

5 mm. Aluminum

$$\frac{\text{9 inch spark gap x 5 millamperes x 7 minutes}}{\text{10 inches}} = \frac{63}{2}$$

Lack of space renders it impossible to include all the points mentioned in this article. Suffice to say that although the formula method of estimating dosage is by no means new, nevertheless the article will serve to emphasize the importance and accuracy of the standard formulæ in *x*-ray dosage. Not only is it possible to establish a safe and satisfactory technique, but also given any three of the four fundamentals, the fourth can always be determined readily and accordingly the danger of over-stepping the margin of safety in either treatment or radiography minimized.

W. A. WILKINS.

Rœntgenographic Study of Bronchiectasis and Lung Abscess after Injection of Bismuth Solution through the Bronchoscope LYNAH, H. L. AND STEWART, W. H.

AMONGST the interesting papers read at the Minneapolis meeting of the American Roentgen Rays Society held in September, 1920, was one with the above title.

No doubt this paper will appear in due course in the Journal of the Society, but attention is here directed to the subject so that those who are interested in the study of pulmonary abscess or bronchiectasis may be aware of what is being done in the way of diagnosisor treatment.

The mixture employed in this procedure was a non-irritating mixture of bismuth carbonate in sterile olive oil, in the proportion of one of bismuth to two of oil, the quantity being 8 c.c. introduced slowly by means of a curved cannula. With the bronchoscope introduced, the patient is instructed to cough and that portion of the bronchial tree identified from which the pus is seen to come. This portion is then injected with the bismuth and oil mixture. It is necessary to work quickly and to make the radiograph as soon as possible after the injection. This means that the manœuvre should be carried out in the radiographic room or that a portable apparatus should be available in the operating theatre.

This method was employed in five cases, and a feature of note is that all the patients were benefitted to such an extent that they asked for re-injection.

The authors were led to undertake this method of injection because it has been the experience of many roentgenologists that the accidental entrance of bismuth into the lung in cases of œsophageal fistula has been followed by no ill effects to the patient. Moreover, in abscess of the lung or bronchiectasis it is often extremely difficult to localize or map out accurately the size and extent of the cavity by ordinary methods.

No doubt this procedure will be of value in certain cases, but it appears to be heroic and not without its risks and has difficulties attached to it which we believe will prevent it from being adopted as a routine procedure in the investigation of bronchiectasis or lung abscess.

W. A. W.

Brachial Birth Palsy and Injuries of Similar Type in Adults. TAYLOR, ALFRED S.: *Surg. Gyn. and Obst.*, 1920, Vol. XXX, p. 494.

THE author affirms that there is a necessity to bring forward this subjcet because of the widespread belief that a spontaneous cure will result in nearly all these cases if treated by non-operative methods such as massage and correction of posture. This view he states is entirely erroneous. The majority do not recover good function no matter how much time or care is used. He disagrees with Thomas' view that the condition is the result of a subluxation of the shoulder joint, and holds that it is wholly due to a stretching of the cervical roots by the dragging apart of the head and shoulder. This results in a temporary paralysis if the strain is slight, but in complete rupture or evulsion of the root if the stretching is sufficient. The strain is felt first in the upper root and this may alone be affected or all fine roots may be torn across. There is in addition nearly always a tearing of the deep cervical fascia and the scalenus muscle. The characteristic attitude, inversion, pronation and flexion of the wrist and fingers, if uncorrected results in permanent deformities of the bones, joints and muscles of the affected arm. In many cases at operation there is found a complete severance of one or more roots which could never recover unless sutured. Prolonged delay makes operation more difficult on account of scar tissue. The slighter cases which get well spontaneously do so within three months. The author therefore recommends that the operation should not be delayed beyond this period unless there is marked improvement shown. He speaks from a sixteen years experience of two hundred cases; seventy of these he has operated on. In some he was able to do nothing. There were no perfect anatomical and physiological results but nearly all were improved and many recovered almost complete function. Only ten were seen within two months after birth and of these, two recovered without operation. Many of the cases operated on had been treated for years without benefit.

The article is well illustrated, the position taken definite and reasonable. The post-operative mortality is, however, high, three out of seventy, even though the deaths might equally have occurred in any operative proceedure on young children.

F. A. C. SCRIMGER.

MEDICINE

The Meltzer-Lyon Method in the Diagnosis and Treatment of Gall Bladder and Biliary Duct Disease. LYON, VINCENT B. B.: *Amer. Jour. Med. Sciences*, October, 1920.

LYON'S work is based on Meltzer's observation at the Rockfeller Institute (A. J. M. Sc., 1917) that local application of 25 per cent. magnesium sulphate solution to the duodenum by means of the duodenal tube, relaxes the sphincter of the common duct and permits the ejection of bile. This action depends on the "Law of Contrary Innervation" which Meltzer enunciated.

In support of this theory, there is a considerable amount of experimental evidence, notably, as shown by Bruns of Pavlov's School, that no bile appears in the duodenum so long as the stomach is empty; but when a meal is taken, the entrance of chyme into the duodenum leads to a discharge of bile from the common duct. Rost found that an injection of peptones or albumoses through a duodenal fistula in a normal dog, caused immediately a discharge of bile from the ampulla—and he proved that this takes place by reflex—causing a contraction of the gall bladder—and simultaneously a reciprocal relaxation of the common duct sphincter. Furthermore, this reflex depends on the integrity of the gall bladder; for after cholecystotomy, the escape of bile is continuous, rather than discontinuous, as it is normally. The nervous mechanism has been demonstrated by Doyen and Freese.

To B. B. Vincent Lyon of the Jefferson Medical School, Philadelphia, this seemed to open up possibilities towards investigating conditions of the biliary tract. His paper which appears in the *American Journal of Medical Sciences* for October, 1920, is convincing as to the practicability of the method, and up to the date of publication, over 300 cases had been tested with a total of 2240 drainages, covering a wide range of biliary tract conditions.

The method employed is as follows: (1) A preliminary mouth wash with potassium permanganate, 1 in 1000, is given, followed by a rinse with weak zinc chlorid solution. (2) Then the duodenal tube, sterile, is introduced into the fasting stomach and residuum aspirated for study, as to gross appearance, chemical findings, microscopy, etc. (3) The stomach is rinsed thoroughly and then the patient is given a glass of water to drink and turned on his right side with the hips elevated by a pillow. It takes 15 to 40 minutes for the bulb to enter the duodenum. This is determined by a change in reaction to litmus, by the "tug" on the tube, the pearly gray character of the fluid aspirated, by the fact that fluid taken by mouth cannot be aspirated, or, by aid of the *x*-rays. Pylorospasm may be overcome by atropine. Normally, in the fasting state, the duodenum is bile free, and the sphincter closed. Assured that the bulb is in place, 50–100 c.c. of 25 per cent. warm sterile magnesium sulphate solution is introduced through the tube from a syringe. In a few minutes, bile appears, and this can be collected by gentle vacuum suction or by gravity drainage—into separate sterile bottles for study. The separation is made by gross appearance judged through the glass canula at the end of the tube. The bile first collected is diluted with magnesium sulphate, but soon this becomes light golden yellow, transparent and of medium viscosity. It varies from 10–30 c.c.; it is designated "A" bile and is considered to come from the bile ducts. Suddenly, the colour deepens to a darker golden yellow, is more viscid, but remains transparent in health. In health, this "B" bile should not exceed 75 c.c. (as the capacity of the normal gall bladder is $1\frac{1}{2}$–$2\frac{1}{2}$ oz.). It is believed that this fraction is derived from the gall bladder—for the following reasons: (1) The colour and viscosity denote a higher concentration and pathologically, in inflammation and stasis, this bile is thick and sometimes greenish black, similar bile being found in the gall bladder at subsequent operation. The cellular and crystalline elements are more numerous; and further, an amount of 3–5 oz. which may be obtained pathologically, could hardly be derived from the common and hepatic ducts with their total length of $8\frac{1}{4}$ inches and average diameter of one quarter inch. In addition, this bile is not obtained where the gall bladder has been removed; and when pathological, it is found to clear up under drainage by this method.

The next change is to a light, lemon yellow, transparent bile, thinner and more limpid. The flow is intermittent, but may amount to several ounces, depending on how long the sphincter remains relaxed. This "C" bile comes from the liver cells.

Pathologically, certain changes are characteristic. In *choledochitis*, grossly, the "A" bile is off colour, turbid, more viscid, with excess of flaky mucus. Microscopically, there are pus cells and epithelial cells, and cultures may show bacteria—especially if associated with cholecystitis.

In *cholecystitis* without choledochitis, "A" bile is relatively normal, but "B" bile shows a change in colour from a deep golden yellow to dark molasses or greenish black, it is turbid, more viscid, and contains flaky or stringy mucus. Pus cells and desquamated epithelium are seen, and cultures will be positive.

In *cholelithiasis*, besides the evidence of cholecystitis, we find a deposition of bile crystals, which is often sufficient to impart a gritty or sandy feel to the bile.

The method is offered: (1) As an aid in *diagnosis* of biliary tract affections. (2) As an *alternative treatment* in those cases in which surgery is not clearly

indicated. (3) As a supplementary method, post-operatively, of *continuing biliary drainage* in those cases incompletely cured by surgical means alone. (4) It has also been employed with striking success in the *treatment of catarrhal jaundice*, the average duration of the illness—as measured by the persistence of jaundice, being reduced from 35 days to 17 days, in a series of cases treated at the U. S. Naval Base Hospital at Brest, and reported by Lyon in the *American Journal of Medical Sciences* for April, 1920. (5) It may be employed in *typhoid convalescence* to ascertain if the gall bladder remains infected; although since the introduction of the high calory diet by Coleman, the complications of cholecystitis seem on the wane. This, Lyon thinks, may be due to the fact that the high calory diet supplies proteoses and peptones to the duodenum, and so initiates the reflex for the gall bladder to contract and discharge its bile.

Occasionally it may be impossible to collect bile from the gall bladder by this means; for instance, where there is a stone obstructing the cystic duct; or it is obstructed by adhesions; where there is hydrops of the gall bladder from swelling of the mucus glands at the neck; or when gall stones completely fill the sac.

A. T. HENDERSON.

The Modern Examination of the Stomach. WHITE, FRANKLIN B.: *Clinics of North America*, September, 1920.

THE writer describes the present as a time when our ideas are in a state of transition, and passes in review all the different methods and means of examination, and gives his opinion of their relative value. He urges the importance of a careful history, and thorough general physical examination.

All the different methods of examination have their failings and we must make our diagnosis on the summing up of the findings of all methods, and by the ruling out of disease elsewhere; in the heart, kidney, lungs and nervous system. No one method can establish an absolute diagnosis but each gives valuable information.

The history tells us much, the physical examination is chiefly important in finding out diseases elsewhere that give rise to reflex stomach symptoms; the examination of the stomach secretions, by means of the test meals or fractional methods of Rehfuss and the examination of the stools, give us important additional information.

The roentgen ray examination he considers the most important single method but shows how lesions in certain positions show no abnormality. In such cases pathological findings will be found with other methods, such as the benzidin test.

The importance of a follow-up system to check up any doubtful or special point is insisted upon. The variations of the normal stomach in size, shape, position and motility must be known and appreciated, as no two stomachs are alike, any more than are any two faces.

R. H. M. HARDISTY.

Errors in the Diagnosis and Treatment of Duodenal Ulcer. DUNHAM: *Amer. Jour. of Med. Sciences*, November, 1920.

THE importance of a careful history and a thorough physical examination is insisted upon, and in addition a chemical analysis of the stomach contents and stools, and an *x*-ray examination of the chest and abdomen should be done in all cases.

The frequency of visceral syphilis is pointed out and the necessity of a blood count and Wassermann test in all cases. The writer quotes authors who say, that before thirty years of age inherited syphilis is the cause of 90 per cent. of gastric and duodenal ulcers, and that 10 per cent. is due to acquired syphilis—the writer does not accept those figures but says that many of his doubtful cases were cleared up by finding a positive Wassermann.

In all cases a rigid course of medical treatment should be carried out in a hospital for four weeks, and then if there is no improvement, and lues excluded, operation should be done.

R. H. M. H.

"Dumping Stomach" and the Results of Gastro-jejunostomy. Operative Cure by Disconnecting Old Stoma. WYLLYS, ANDREWS and MIX: *Surgical Clinics of Chicago*, October, 1920.

THE patient had had digestive disturbances for years and had a gastro-jejunostomy performed in November, 1917. He became worse after the operation although still, for part of the time at least, under treatment.

He was seen in 1919 and the *x*-ray examination of the stomach showed that the stomach contents were immediately emptied into the bowel through the gastro-enterostomy opening: This was done so rapidly that there was great difficulty in getting a plate taken before the barium left the stomach. He was operated upon and the gastro-jejunostomy undone and some adhesions the probable cause of his original digestive disturbances broken down. Some months later the patient reported himself better and gaining weight. Interesting to note is the fact that the patient said that after a drink, the fluid seemed to rush down through his bowels, and also that at the time of operation an intense enteritis was observed in the jejunum the result of the passage of undigested food and acid secretion into the bowel.

R. H. M. H.

Treatment of Hyperemesis of Pregnancy. RATHERY, F. and BORDET, F.: *Annales de Medecine*, 1920, Vol. VIII, p. 92.

F. RATHERY and F. Bordet (p. 92), report four cases of uncontrollable vomiting of pregnancy, persisting for from one to two months, with extremely severe symptoms, cured by adrenalin hydrochloride, after all other methods of treatment had failed. This was given in from one to two milligrammes daily for from four to seven days, either hypodermically, (in 250 c.c. of normal saline), or per rectum, or when possible by mouth. Vomiting ceased at once; acidosis disappeared, and blood pressure was practically unaffected, no matter by what method it was administered. They found that intravenous injections of glucose failed to affect the acidosis as much as did the adrenalin injections. J. L. D. MASON.

The Treatment of Seasickness. CHEINISSE, L.: *La Presse Medicale*, November 6, 1920, p. 798.

L. CHEINISSE (p. 798), on "The Treatment of Seasickness," refers to various methods hitherto employed to overcome the cerebral anæmia believed to be the cause of it, and which is really only a secondary phenomenon. He explains the theory of Professor P. Nolf of Liege, that seasickness is due to abnormal stimulation of the vestibular apparatus by the unusual motion, and that this in turn affects the nerve centres in the bulb, particularly that of the vagus, producing the cardiac and gastric symptoms.

As a result of this theory he employed atropine,—for its well-known action on the vagus,—in a series of cases extending over four years. The results were uniformly successful, with but a few exceptions (probably due to too small doses). These should be sufficient to produce the physiological effect of diminished secretions, and a moderately increased rate of pulse.

Ordinarily two milligrammes of atropine sulphate divided into three doses, and given by mouth at half-hour intervals from the time of departure are sufficient. Or one milligramme hypodermically may be administered for immediate action. Very susceptible subjects should take half a milligramme three or four times daily throughout the journey.

Mr. Pierre Cazamian, physician-in-chief of the French Navy, reports similar success, adding six milligrammes of adrenalin divided into three doses by mouth at half-hour intervals, in cases of low arterial tension. J. L. D. M.

Tuberculosis and Influenza. HAWES, J. B.: *Boston Med. and Surg. Jour.*, November 18, 1920.

THE author quotes the observations and conclusions of a large number of eminent authorities, either in charge of, or actively associated with tuberculous sanitaria, where a good opportunity availed itself during the recent influenza epidemics to study the relations between tuberculosis and influenza, and arrives at the following conclusions:

1. Influenza is a serious, but by no means a hopeless or fatal complication of tuberculosis.

2. It is possible that a tuberculous patient possesses a certain degree of immunity against influenza.

3. Post-influenzal bronchitis may disguise a newly awakened pulmonary tuberculosis. Prolonged cough and physical depression following influenza should make one suspicious, and the patient should be kept under constant supervision.

4. Influenza and its effects render the early diagnosis of tuberculosis increasingly difficult.

Influenzal changes in lungs have been classified as pulmonary tuberculosis. Many cases of tuberculosis have been discovered or made active on account of influenza. J. KAUFMANN.

Mononuclear Leucocytosis in Reaction to Acute Infections ("Infectious Mononucleosis"). SPRUNT, T. P. and EVANS, F. A.: *Johns Hopkins Hospital Bulletin*, November, 1920.

THE conclusions in this paper are based on a study of six cases. Each case exhibited a mononuclear leucocytosis in reaction to an acute infection, and the information obtained from the study leads to the following conclusions:

1. A mononuclear leucocytosis is met with in adults as a reaction to an acute infection.

2. The leucocytosis is made up largely of pathological forms, probably all lymphoid in origin.

3. The symptoms and signs in these cases are so much alike that they may be considered provisionally as a clinical entity.

4. In the early febrile stages these cases cannot be differentiated with assurance from leukæmia, but the subsequent course makes the diagnosis clear.

5. Recovery took place in all the cases. J. K.

Non-Tuberculous Lung Changes Following Pneumonia. PACKARD, E. N.: *Jour. Amer. Med. Assoc.*, December 4, 1920.

The author presents a study of non-tuberculous changes in the lungs occasioned by pneumonia and its accompanying pleurisy, and concludes as follows:

1. On account of the recent high incidence of pneumonia, a great many chronic lung changes will be encountered in the next few years.

2. The permanent changes unlike tuberculosis are almost always basal; they are mainly of the nature of a fibrosis, and bronchial dilatation, and frequently infection.

3. Abnormal apical physical signs should be considered as due to pulmonary tuberculosis until proved not to be. Basal signs should be considered non-tuberculous until definitely proved so. (Lawrason Brown.) J. K.

Effect of Tonsillectomy on the Recurrence of Acute Rheumatic Fever and Chorea. LAWRENCE, W. ST.: *Jour. Amer. Med. Assoc.*, October 16th, 1920.

THIS is a study of the results of tonsillectomy on ninety-four children at a special cardiac clinic. The cases were all carefully observed for varying periods before operation and for a long period afterwards. No cases followed for less than two years after operation are included. The majority were examined at monthly intervals between the time of operation and of writing. They had all had some of the rheumatic group of manifestations such as acute rheumatic fever, chorea, myositis, bone and joint pains, and tonsilitis.

The tonsils were markedly hypertrophied in 13 per cent., moderately so in 69 per cent., and not enlarged in 18 per cent. of the cases. They all had palpable tonsilar lymph nodes before operation and in 40 per cent. afterwards. All of the latter number were, however, greatly reduced in size. He insists on the necessity of post-operative examinations as he found a second operation necessary in one-fifth of the cases.

Sixty per cent. showed no recurrence of the above rheumatic manifestations, following the operation. It must be borne in mind, though, that all of them were under constant supervision by the physician and a social worker and their mode of living must have been greatly improved. Of forty-two cases who had previously had rheumatic fever only seven had a recurrence following this operation. One-half of the chorea cases had recurrence. Nutrition and general health were improved, and intercurrent disease was less common after the tonsils were removed.

Basal Metabolism Determinations in General Internal Diagnosis.

THE basal metabolism in any normal individual is found to vary but little from day to day and from year to year, provided the weight remains unchanged. Metabolism in the individual, however, is found to vary under many conditions. The intake of food, muscular work and exposure to cold are common factors which cause an increase, and certain pathological conditions, as fever, acidosis and disturbances in the internal secretions, give rise to definite changes.

In basal metabolism we are dealing with a factor nearly as constant as body temperature and because of the light it throws upon the calorific requirements of the body, quite as interesting. The author states that basal metabolism determinations have been placed on a practical clinical basis by the Benedict portable apparatus, and the next step is for clinicians to determine the range and value of its clinical application in routine diagnosis. Basal metabolism determinations have been more widely directed to the problems connected with alterations in the secretion of the thyroid than to any other clinical problem up to the present.

In a recent paper (*Jour. Amer. Med. Assoc.*), April 3rd, 1920, Dr. G. W. McCaskey discussed its value as an index to the severity of the poisoning in hyperthyroidism. The routine determination of its amount is in his opinion worth while.

1. In all cases of definite goitre, especially in those cases associated with health disturbances, to ascertain the degree of the toxicity.

2. In the large group of cases either with or without goitre, in which symptoms are present resembling either closely or remotely those of thyrotoxicosis.

In regard to the first group, whenever a patient with a goitre has impairment of health, whether the symptoms are typical or not of thyrotoxicosis, the toxicity of the goitre should be determined by this method. This is especially true when discussing the nature and character of therapeutic measures whether medical or surgical. It is of the first importance in judging of the operative risk in thyroidectomy, and it furnishes a quantitative index of the effectiveness of treatment.

Equally important and presenting great diagnostic difficulties, is the second group indicated. Among the symptoms suggesting investigation along these lines may be mentioned, psychoneurotic disturbances; circulatory disturbances: (a) tachycardia or bradycardia. (b) cardiac myasthenias. (c) certain arrythmias; fine tremors; hyperidrosis and hypoidrosis; general debility; loss of weight; slight temperature disturbances.

Not one of the foregoing symptoms can be regarded as strongly diagnostic much less pathognomonic of hyperthyroidism or hypothyroidism. In fact, if the majority or perhaps all of these symptoms were present in an individual case, the syndrome might still be due to some affection entirely apart from thyroid disease. Differentiation from thyrotoxicosis can usually be made with a certain degree of probability by the general clinical picture, but the final court of appeal as far as the thyroid problem is concerned must rest in the determination of the basal metabolism.

Dr. McCaskey concludes his paper by presenting a series of cases in which basal metabolism determinations furnished the decisive factor in a diagnosis, which could not have been otherwise made, owing to the presence of other conditions, which masked the clinical picture. F. R. BROWN.

The Value and Mechanism of the Colloidal Gold Test. CRUICKSHANK, J.: *Brit. Jour. of Exp. Path.*, April, 1920, Vol. I.

IN an interesting article the author explains in so far as known the mechanism of the colloidal gold reaction, adding original observations of his own. In

1917 Felton showed that the zonal reactions were dependent upon the relative amounts of globulin and albumin present in the cerebro-spinal fluid, the former exerting a precipitating action, the latter a protective one. By varying the amount of albumin present the author was able to convert a marked paretic reaction into a meningitic one. Furthermore by separating out the globulin from negative fluids he was able to show that the paretic reactions were not solely due to the increased globulin content *per se*, but that an alteration had taken place in the physical and chemical character of the globulin. Human blood serum likewise in its globulin fraction exerts a precipitating power. The albumin has only protective powers. Of other animals tested that from the rat alone precipitates gold.

News

ALBERTA

A SERIES of recommendations regarding the handling of tuberculosis in Calgary, drawn up by Drs. C. S. Mahood and A. Fisher, were recently placed before the Provincial Minister of Health and the Provincial Health Officer, and are under favourable consideration at present. They suggested that the tuberculosis situation in that city be handled as far as possible by the Provincial Health Department; that the Tuberculosis Sanatorium at Bowness recently erected by the Dominion and the Alberta Provincial Governments, be permitted to care for advanced as well as incipient cases; that provision for a central Tuberculosis Clinic be made at the Calgary General Hospital, and that the Mount View Hospital be reserved for a few very advanced cases, and used for a Diagnostic Clinic. It was further suggested that a grant be given to the city of Calgary if a Tuberculosis Clinic be started there.

AN interesting address was delivered to the Calgary Medical Society on October 5th last, by Mr. R.M. Bennett, K.C., on "The Physician and the Law". The part of the physician was both as an ordinary witness, when he is only required to state facts, and as an expert witness when a certain degree of technical skill is demanded by the Court. The subject of collection of debts and malpractice was touched upon. A vote of thanks to the speaker was passed. At the next meeting of this society on October 19th, Dr. E. Sisley gave a paper on "Internal Pre-operative, Operative, and Post-operative Treatment", in which he pointed out that in the present ideal state of aseptic surgery, atoxis in the form of relieving the internal economy of accumulations should be looked to.

On November 2nd another legal address of much interest was given by Mr. Clifford T. Jones, K.C., on "The Unsound Mind and the Law". At the close the speaker laid stress on the shameful way insane patients are often treated in this country in being arrested as ordinary criminals and tried in the civil courts before commitment. Dr. Fisher explained that the Calgary General Hospital had six wards for observing patients thought to be insane prior to their commitment to the Provincial Hospital for the Insane. Dr. Stanley moved that the Calgary Medical Society request the Executive of the Alberta Medical Society to appoint a committee to meet with the committee of the Law Society, to take up the whole matter of insanity with the committee recently appointed by the Dominion Government for the purpose of revising the Statutes. This was seconded by Dr. Merritt and carried.

AT the annual meeting of the Academy of Medicine of Edmonton, held on December 1st, the following officers were elected: Honorary President, Lieutenant-Colonel R. H. Brett; President, T. H. Prust; First Vice-President, L. C. Conn; Second Vice-President, W. D. Chappelle; Treasurer, R. F. Nicholls; Secretary, H. H. Hepburn; Executive Committee, J. J. Ower, Wm. Dickson, and J. F. Adamson; Hospital Advisory Board, J. S. Wright, A. F. Anderson, A. R. Munro, J. MacD. Oswald, E. Allin, T. H. Whitelaw. The address of the retiring President was an admirable one and much enjoyed by those present. Dr. Whitelaw, M.O.H., presented a statement on the serious nature of the smallpox outbreak in Edmonton for the last year. It showed that there had been 221 cases of smallpox, of which 100 were of school age or under. There were two deaths. None of the 100 children had ever been successfully vaccinated. Of the 221 cases, only 15 had ever been successfully vaccinated and these were all adults from 38 to 75 years of age, who had a rather indifferent vaccination in infancy. The statement showed that the vaccination law which had become inoperative five years ago through anti-vaccination propaganda, and through the apathy of the medical profession, had not yet been amended by the Provincial Board of Health, and that as a consequence many of the younger children attending the schools had been neglected, over 60 of them under 12 years of age having recently been affected. An osteopathic physician resident in Edmonton recently published a

statement opposing vaccination in which he grossly libelled the medical profession and a discussion took place as to how he was to be disciplined. The opinion, strongly supported by His Honour the Lieutenant-Governor, Dr. Brett, was unanimous that his name should be struck off the roll of the College of Physicians and Surgeons for his offence and that he was and is a menace to the health of the community. A special meeting was arranged for the 15th of December, of the Academy, to which Provincial Officers were to be invited, as well as the Press. It was expected that publicity would then be given to the fact that the medical profession is a unit in favour of vaccination as a preventive of smallpox, and that the insidious campaign of the anti-vaccinationists should not be taken seriously by the public.

Medical Societies

THE CANADIAN MEDICAL WAR MUSEUM, THE OSLER PATHOLOGICAL COLLECTIONS AND THE HISTORICAL EXHIBIT OF THE HOTEL DIEU, AT THE EXHIBITION OF THE CONGRESS OF THE AMERICAN COLLEGE OF SURGEONS.

A NOVEL feature of the Montreal Meeting of this Congress, held on October 12th to 15th last, and one which awakened much appreciation as contributing greatly both to the interest and to the academic character of the proceedings, were the exhibitions held for the benefit of the members at McGill University, and at the Hotel Dieu Hospital. A very important part of the whole was the splendid exhibit contributed on this occasion from the Canadian Medical War Museum by permission of the Director General of Medical Services, and which was set up in the Assembly Hall of the Medical Building at McGill University. The war material shown was collected in France and was prepared for the Dominion Government in the workshops of the McGill Medical Museum under the direction of the Curator and the Museum Staff. The display presented was of an imposing and most attractive character, and it was in some respects unique. The most spectacular part of it was undoubtedly the series of war injuries of bone presented by Major L. J. Rhea, which were collected and prepared by him directly after the autopsy, often with the help of *x*-ray plates taken before death, and which bear the hall-marks of scientific observation and careful study as well as of manual skill; and the serial drawings and casts of reconstructive surgery of the face, presented by Majors F. E. Risdon and C. W. Waldron. Other exhibits in the series of great interest were the gunshot wounds of soft tissues, and injuries of the respiratory tract by noxious gases by Major F. B. Gurd; water colour paintings of traumatic lesions of the fundus of the eye, by Colonel S. H. McKee; prosthetic appliances and type deformities due to nerve lesions by Colonel C. L. Starr; *x*-ray lantern slides of war injuries by Major A. H. Pirie; a series of fifty-two water colour sketches made by Canadian War-Office artists showing Army Medical arrangements in the field; captured German gas-apparatus, and other trophies; and the first Canadian overseas flag, shown by the Dominion Government.

The entire war exhibit was presented in book form in a detailed descriptive catalogue, which was of more than passing interest, in that it summarized the work done on the material mounted and prepared for the Canadian Medical War Museum to date.

The other section of the Congress Exhibition at McGill was held in the Museum of the new medical building. Here the greatest interest centred around the large pathological collections made by the late Sir William Osler during his term as pathologist to the Montreal General Hospital and an historical exhibit of records, pictures, and books bearing upon this work and upon his Canadian period. Other exhibits were: researches into the cancer problem by Professor A. Peyron, of the Pasteur Institute; studies in the circulation of the heart by Dr. Louis Gross; and pathological series by the Museum Staff.

Two symposiums were held during the Congress in its museum. The first was upon the war specimens, Major-General F. J. T. Fotheringham in the chair; the second was upon the Osler pathological and historical exhibit and was addressed by Dr. Norman Gwyn, Professor F. J. Shepherd in the chair.

An extremely interesting historical exhibit showing records, pictures and relics bearing upon the early history of old Montreal and of its oldest hospital, the Hotel Dieu (founded in 1642), was held at that institution under the auspices of the French section of the congress. It was largely visited and was much appreciated

Books Received

THE SYSTEMATIC TREATMENT OF GONORRHŒA IN THE MALE. By NORMAN LUMB, O.B.E., clinical assistant, St. Peter's Hospital for Stone. Second edition, 123 pages. Price $1.75. Publishers: Lea & Febiger, Philadelphia and New York, 1920

A TEXT-BOOK OF BIOLOGY, for students in general, medical and technical courses. By WILLIAM MARTIN SMALLWOOD, Ph.D., professor of comparative anatomy in the Liberal Arts College of Syracuse University. Fourth edition, thoroughly revised 308 pages. Price $3.50. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

THE ESSENTIALS OF HISTOLOGY, Descriptive and Practical For the Use of Students. By SIR EDWARD SHARPEY SCHAFER, F.R.S., professor of physiology in the University of Edinburgh. Eleventh edition, 575 pages. Publishers: Lea & Febiger, Philadelphia and New York, 1920. Price $4.50.

SCURVY: PAST AND PRESENT. By ALFRED F. HESS, M.D., clinical professor of pediatrics, University and Bellevue Hospital Medical College, New York City. 279 pages with illustrations. Publishers: J. B. Lippincott Co., Philadelphia, London, and 201 Unity Building, Montreal, 1920.

PUBLIC HEALTH AND HYGIENE. In Contributions by Eminent Authorities. By WILLIAM HALLOCK PARK, M.D., professor of bacteriology and hygiene, University of Bellevue Hospital Medical College, etc. 884 pages. Price $10.00. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

SURGERY: ITS PRINCIPLES AND PRACTICE. For Students and Practitioners. By ASTLEY PASTON COOPER ASHHURST, A.B., M.D., F.A.C.S., associate in surgery in the University of Pennsylvania, etc. 1202 pages. Price $10.00. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

SYPHILIS. By LLOYD THOMPSON, Ph.B., M.D., physician to the syphilis clinic Government Free Bath House. Second edition, thoroughly revised, 486 pages. Price $7.00. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

DIAGNOSIS AND TREATMENT OF BRAIN INJURIES With and Without a Fracture of the Skull. By WILLIAM SHARPE, M.D., professor of neurologic surgery, New York Polyclinic Medical School and Hospital. 757 pages with 232 illustrations. Price $8.00. Publishers: J. B. Lippincott Co., Philadelphia and London, and 201 Unity Building, Montreal, 1920.

ANÆSTHETICS, THEIR USES AND ADMINISTRATION. By DUDLEY WILMOT BUXTON, M.D., B.S. Sixth edition, 548 pages. Price 21/- net. Publishers: H. K. Lewis & Co., Ltd., London, 1920.

ANNIVERSARY TRIBUTE TO GEORGE MARTIN KOBER. In Celebration of his Seventieth Birthday. By his FRIENDS AND ASSOCIATES, March 28, 1920. FRANCIS A. TONDORF, S.J., Ph.D., *American Journal of Physical Anthropology*. Vol. iii., January-March, 1920. Washington, D.C., 1920. 381 pages.

ANXIETY HYSTERIA: MODERN VIEWS ON SOME NEUROSES. By C. H. L. RIXTON, M.D., M.R.C.S., senior neurologist, Ministry of Pensions' Neurological Hospital, and D. MATTHEW, M.C., M.B., Ch.B., with a foreword by COLONEL SIR A. LISLE WEBB, K.B.E., C.B., C.M.G., 124 pages. Price 4/6 net. Publishers: H. K. Lewis & Co., Ltd., London, 1920.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures and especially prepared original articles on treatment, medicine, surgery, etc. Edited by H. R. M. LANDIS, M.D., Philadelphia, with the collaboration of CHAS. H. MAYO, M.D., and others. Volume iii., Thirtieth Series, 1920. 297 pages. Publishers: J. B. Lippincott Co., Ltd., Philadelphia and London, and 201 Unity Building, Montreal, 1920.

PRINCIPLES OF BIOCHEMISTRY. For Students of Medicine, Agriculture and Related Sciences. By T. BRAILSFORD ROBERTSON, Ph.D., D.Sc., professor of physiology and biochemistry in the University of Adelaide, South Australia. 633 pages. Price $8.00. Publishers: Lea & Febiger, Philadelphia and New York, 1920.

Book Reviews

PHYSIOLOGY AND PATHOLOGY OF THE CEREBRO-SPINAL FLUID. By WILLIAM BOYD, Professor of Pathology, University of Manitoba. Publishers: The MacMillan Co., New York, 1920.

THIS book is a really masterly exposition based on an exhaustive survey of the literature and a thorough knowledge of the cognate researches to date, of a subject of absorbing interest alike to physiologist, surgeon and internist. As is known to us all, the study of cerebro-spinal fluid has yielded much, and under the increased refinement of modern methods promises still more, both in general diagnosis and therapy, and in the solution of the obscure problems of neuro-psychiatry. Dr. Boyd has approached it from the standpoint of the trained pathologist, whose province it is to trace the bearing of the anatomical considerations and physiological principles involved upon the problems of disease that confronts the clinician as practical issues. That his vision has been sharpened by personal experience gained at the bedside, and broadened by a knowledge of the Masters of Medicine is evident from the dedication, "To my old teacher and Chief, Byron Bramwell," and the quaint opening inscription from Magendie. The result is a volume, which in simplicity of treatment and lucidity of style and really fascinating presentment of important facts has probably not been equalled by any Canadian author since Osler's "Diagnosis of Abdominal Tumours" appeared. The publication of this book is thus to be regarded as a real event in Canadian Medicine, and it may fittingly be taken as representative of that new era of production upon which we are entering now. The bookmaking is excellent, and the coloured plates with which it is enriched are remarkably fine. The literature is covered by a complete bibliography.

The subject-matter is divided into two parts. The first, general, part gives a historical introduction and deals with anatomical considerations and various physiological problems, such as the origin of the fluid from the choroid plexus and arachnoid surface as an "elective filtration"; its mode of circulation from the cortex downward and upward from the spinal sub-arachnoid; its rapid absorption through the arachnoid villi into the venous sinuses, and the subsidiary mechanism of the lymphatics of the neck; its freedom from noxious elements in the circulating blood thanks to the barrier set up by the choroid plexus; its mechanical, protective, and metabolic functions; the degree and variations of its pressure and the conditions on which the latter depend; its physical and chemical properties and its normal and pathological cytology. The procedure of lumbar puncture and its applications is outlined, and the technique of the Wassermann and colloidal gold reactions is given with much simplicity. The substitution of the mastic test for the latter, and the possibility of the very early diagnosis of syphilis by using a cholesterized heart antigen with relatively large amount of spinal fluid, are noted.

The second, general, part is devoted to the consideration of those diseases in which examination of the cerebro-spinal fluid may be of help in the diagnosis, or intraspinal therapy effective. Therapeusis is considered under two heads, (*a*) drainage, and (*b*) injection of sera or drugs. A fruitful field for research is indicated. The book is stimulating as well as suggestive. It should be in the hands of every practitioner, and on the shelves of every laboratory. M. E. A.

DISEASES OF CHILDREN. Presented in Two Hundred Case Histories of Actual Patients selected to illustrate the Diagnosis, Prognosis and Treatment of the Diseases of Infancy and Childhood, with an Introductory Section on the Normal Development and Physical Examination of Infants and Children. By JOHN LOVETT MORSE, A.M., M.D., professor of pædiatrics, Harvard Medical School. Third edition, 639 pages with illustrations. Price, $7.50. Publishers: W. M. Leonard, 711 Boylston Street, Boston, 1920.

THIS is the latest addition to the Case History Series of medical text-books. It is again made obvious that it is much more instructive, as well as interesting, to study a book of notes on actual cases than to refer to a text-book of the older type in which all possible symptoms and signs are given. One rarely if ever sees a "typical text-book case". The difference between the two types of book is that between a living child and a catalogue. The cases are grouped under the various systems and organs; two hundred patients are clearly described. Nearly one-third of the book refers to the alimentary tract and disease of nutrition. The problems of infant feeding are fully discussed. The introductory chapter (Sixty-two pages) on the Normal Development and the examination of children is the most valuable account of the normal child known to the reviewer and is to be recommended to those teachers who claim that Pædriatics is merely the study of disease occurring in young patients. Material added to the earlier editions refers to blood-pressure tables, congenital obliteration of bile duct, neosalvarsan pertussis vaccine, tables of food values, pneumococcus meningitio, infantile paralysis, diabetes mellitus and insipidus, etc.

Numerous illustrations add to the value and interest of the book. The index is unique in that one is enabled to quickly turn to any disease or to groups of similar cases successfully differentiated. Necropsies and pathology are not considered. Thus the author assumes a great deal of knowledge and experience in the reader and his book is not recommended as the first book on pædriatics to be bought by a medical student, though it cannot be too highly praised. F. M. F.

CEREBRO-SPINAL FLUID; In Health and in Disease. By ABRAHAM LEVINSON, B.S., M.D., Associate in Pædiatrics, North-western University Medical School, etc., Chicago, with a Foreword by L. HEKTOEN, M.D., 225 pages with 56 illustrations and 5 coloured plates. Price, $3.00. Publishers: C. V. Mosby Co., St. Louis, 1919.

THAT over 200 pages of valuable information on cerebro-spinal fluid can be brought together is proof of a great increase in our knowledge of this subject in the last few years. A very interesting historical sketch (from the days of Hippocrates) forms the first chapter. The anatomy and physiology concerned is fully discussed, and all details of techinque required in procuring the fluid are given. An exhaustive description of all properties of the normal fluid forms a valuable chapter, while the most interesting portion to a practitioner, perhaps, is that devoted to examination of the fluid for diagnostic purposes. This chapter is unusually clear and practical. A systematic account of pathological charges grouped under the various diseases is an additional aid, while the final chapter takes up intraspinal treatment (epidemic meningitis, tetanus, syphilis, etc.). Sixty illustrations are clear and practical. For a book in the English language, the bibliography is strikingly full, and is alone worth the price of the book.

REPORT FROM THE DEPARTMENT OF PATHOLOGY AND THE DEPARTMENT OF CLINICAL PSYCHIATRY, CENTRAL INDIANA HOSPITAL FOR THE INSANE. 1915-1916 and 1916-1917. Vol. vii. Wm. B. Burford, Contractor for State Printing and Binding, 1919.

This volume contains the reports from the Department of Clinical Psychiatry and Pathology of the Central Indiana Hospital for the Insane for the fiscal years of 1915-1916 and 1916-1917. It is a most comprehensive report. Until recently and even now by many people, a hospital for the insane was simply regarded as a place where people suffering from mental disease were thrown and forgotten. Anyone who reads the report of the Central Indiana Hospital for the Insane soon learns that the insane in some institutions at least are getting as intensive care and treatment as is accorded to the sick in any of the other realms of medicine. Each patient is regarded as an individual study and judging from the report, he obtains an examination from every view point of medicine. He is not simply classified as insane and forgotten. He is studied from the psychiatric, neurologic, medical, surgical and chemical standpoint. The Indiana Hospital has also been of great help to the community by giving a full course of lectures and clinics to not only the students of the University of Indiana, but to practising physicians and to the Indianapolis Medical Society. The report is well written and exhaustive in its presentation. G. S. M.

HAND BOOK OF SANITARY LAW. By B. BURNETT HAM, M.D., D.P.H. Eighth edition, 16 mo., pp. Price, 5/–. H. K. Lewis & Co., Limited, London, 1920.

Sanitary Law is one of the most difficult subjects required for the Diploma of Public Health, and students preparing for the diploma are extremely fortunate in having such a book as "Burnett Ham" at their disposal.

It is not a text-book, but simply a crambook, and as such can be strongly recommended to students and others for whom it is intended. This, the eight edition, shows great improvement over all previous editions. Every chapter has been revised, enlarged and brought up to date.

The publishers are to be congratulated on having secured, as editor, so distinguished an authority on public health as Dr. Henry R. Kenwood. R. ST. J. M.

AN INTRODUCTION TO BACTERIOLOGY FOR NURSES. By HARRY W. CAREY, A.B., M.D., assistant bacteriologist, Bender Hygienic Laboratory, Albany, N.Y. Second revised edition, 149 pages. Price $1.25 net. Publishers: F. A. Davis Company, Philadelphia, Pa., 1920.

This little book is a brief but comprehensive survey, written in sufficiently simple language and without undue detail, of the facts of bacteriology, and of those elementary principles of scientific medicine that govern the reactions of infection and immunity to disease, and that underlie the treatment and prognosis of the individual case. It is another of the large series of Nursing manuals now appearing, which aim at the higher theoretical education of the trained nurse with a view to qualifying her to be the intelligent co-operator of the surgeon. The subject is well and clearly treated, and is brought up-to-date in this, the second edition of the work. The book is completed by a glossary of terms. M. E. A.

THEORY AND PRACTICE OF NURSING. By M. A. GULLAN, Sister Tutor of St. Thomas's Hospital. 214 pages. Price 10/6 net. Publishers: H. K. Lewis & Co., Ltd., London, 1920.

Any book that summarizes the instruction given to the Nurses in Training at the Nightingale School of

the St. Thomas' Hospital is bound to claim our immediate respect, and this little volume maintains the traditions of its school. As the title implies the entire field of medical and surgical practice is briefly reviewed, first from the theoretical side and then from the practical standpoint of the bearing of this upon the range of nursing activities. The physiology of the various vital processes and the nature, prognosis, and treatment of the various groups of disease are outlined. Special chapters are also devoted to the subjects of pulse, temperature, the intake of food, the technique of enemata, lavage, catheterization, baths, local applications, administration of drugs, and the examination of urine. A mass of practical information upon standard methods and the rationale of their application is thus brought together, making this valuable nursing manual, vade-mecum and guide.

The book is quite evidently written by a nurse and not a physician. As a nursing manual, however, it is the gainer by this, for it combines with a grasp of first principles, an insight into the Nurse's part and art. M. E. A.

A Text-Book of Physiology: For Students and Practitioners of Medicine. By Russell Burton-Opitz, S.M., M.D., Ph.D., associate professor of physiology, Columbia University. 1185 pages with 538 illustrations. Price $7.50. Publishers: W. B. Sanders Company, Philadelphia and London, 1920.

In many ways this is an excellent account of modern physiology from the medical point of view. The book in the main is compiled along conventional lines. A few points demand attention. It is doubtful whether it is well when writing for students to defer the consideration of dietetics, digestion, and absorption until quite so late a part as Part VIII (p. 985).

Chapter XL, "The Seat and Nature of the Oxidations," should have come much nearer the chapter on the history of the food-stuffs; and if reductase was to be mentioned at all, it should have been referred to in the chapter in which internal respiration was being discussed, instead of being merely placed in a list of enzymes as late as page 989. It is there described as performing only deoxidations, whereas, as Fraser Harris has shown, it can reduce many substances possessing no oxygen at all.

More might have been said about the various proofs of the circulation of the blood adduced by Harvey; students should know exactly on what that great generalization was based. The index to the book strikes one as, in some respects, curiously incomplete, for instance: the names of Head and of Sherrington do not occur in it. The views of Edridge-green on colour vision are not alluded to, nor is the work of Barany on the semi-circular canals. Head's recent views on the primitive sensory functions of the optic thalamus are not mentioned.

Whereas one or two diagrams are rough, the majority of the 538 are excellent, and some are quite new. D. F. H.

Studies on Epidemic Influenza. Clinical and Laboratory Investigations. By Members of the School of Medicine, University of Pittsburgh.

A notable contribution to the literature of influenza has been published by members of the Faculty of Medicine of the University of Pittsburgh. The studies embrace a series of articles dealing exhaustively with all sides of the disease and form a mine of information on the subject.

Dr. Johnston, in an interesting and exhaustive review on the history and epidemiology of the disease, shows clearly that the features of the great epidemic 1818-1819 are repetitions of a malady known for centuries. Short, in 1510, refers to three striking features in the epidemic of that period, in the presence of nose bleed, pneumonia and the great danger to pregnant women. In 1693 Molyneux of Dublin called attention to the comparative immunity of aged individuals, a fact which has been impressed by recent experience, although by no means a rule in many of the recurring waves of the disease.

The belief, formerly almost universal and even yet prevalent amongst the laity, that unfavourable weather conditions favoured the prevalence of the disease, was denied by English physicians in 1775, and as early as 1752 and 1762, Whyte and Baker expressed similar views, but that the malady was contagious does not seem to have occurred to these observers. That weather conditions have little or no influence on the prevalence of the disease is shown by the United States experience of 1918-19 when fine clear weather prevailed in most of the large centres where the malady was epidemic. The prevalent belief in the dependence of the disease on unfavourable meteorological conditions is a good illustration of the persistence of tradition.

Ample proof exists that at least one case must exist in a family or community before the disease becomes epidemic. Amongst numerous records a striking instance of contagion is reported from Masontown, Pennsylvania. A musician from a neighbouring city was unwell on arrival and was prostrated by the disease after the evening's performance. From this primary case the town was swept by the epidemic. Institutions such as schools often enjoyed immunity as long as a strict quarantine was observed, and the disease only made its appearance in these institutions after relaxing the regulations.

The clinical description of the disease by Dr. Lichty and the treatment by Dr. McLachlin with a section on the blood and urine should be carefully read by clinicians. A useful classification into two

types is suggested, the one involving the upper air passages and resulting in an ordinary influenza, the other affecting the lower respiratory tract and culminating in bronchial-pneumonia. Respiratory symptoms occurred late or early at some period of the disease in all cases.

In the treatment Dr. McLachlan speaks with some confidence in the value of citrated blood or serum from convalescent pneumonia cases and his own results support other observers in the use of this method.

The prevention of influenza is discussed fully by Dr. Haythorn, chiefly in the light of American experience.

The results obtained from vaccines prepared from Pfeiffer's bacillus and from mixed vaccines are not encouraging. Indeed the large number of cases developing shortly after the use of Pfeiffer bacillus vaccine suggests a negative phase and the writer advises caution in exposure in recently vaccinated individuals. There is no reference to the encouraging results published by Leishman, in both morbidity and mortality, from the use of a mixed vaccine.

Dr. Holman's article on bacteriology presents the results of a painstaking investigation and strongly supports the view that Pfeiffer's bacillus is the cause of the disease. In thirty-two cases he was able to isolate this organism from 25 to 78 per cent. In the seven negative cases technical difficulties prevented the isolation of B. influenzæ, even if it had been present. It thus fulfils one of Koch's postulates. Details of other infecting organisms are fully described.

The pathology of the disease is dealt with by Dr. Klotz. An excellent description is presented of the morbid changes in the air passages and lungs, and is well illustrated by coloured plates. The frequent development of bronchiectasis is attributed to the weakening of the bronchial wall by the high grade of injury to the tubes in the inflammatory stage.

An interesting feature of the article is the extensive change in the muscles, consisting in degeneration and hæmorrhages, occasionally resulting in rupture which has been seen in the recti muscles. Dr. Klotz suggests that these anatomical changes may be responsible for the severe pains which are such a striking clinical manifestation of the disease.

We can cordially recommend the perusal of the remaining articles in the book as authoritative statements to those interested in the subject of influenza.

F. G. F.

HUMAN PARASITOLOGY. With Notes on Bacteriology, Mycology, Laboratory Diagnosis, Hæmatology and Serology. By DAMASO RIVAS, B.S. Bio., M.S., M.D., Ph.D., assistant professor of parasitology, University of Pennsylvania. 715 pages, illustrated. Price $8.00 net. Publishers: W. B. Saunders Co., Philadelphia, London, 1920.

This is a good book. It is complete and logical in the arrangement of its material. The indices of authors and of subjects, as well as the list of references to original observations, are satisfying in their usefulness. The treatment of the subject is thoughtful. While accepted explanations of obscure points are given, dogmatism is avoided and, by the acknowledgement of uncertainty in reference to matters unknown, the imagination of students is stimulated.

The scope of the work is encyclopædic since it attempts to cover the whole range of living things which may be parasitic upon man. The attempt is as nearly successful as such an effort may be. The general excellence of the work is so high that occasional unhappy occurrences are the more striking. These will undoubtedly be rectified in the next of the many editions through which this valuable addition, in English, to the discussion of human parasitology will certainly run.

J. L. T.

MEDICAL ELECTRICITY, a Practical Handbook for Students and Practitioners. By H. LEWIS JONES, M.A., M.D., F.R.C.P. Eighth edition. Revised and edited by LALLUM WOOD BATHURST, M.D. Price 22/6 net. 575 pages. Publishers: H. K. Lewis & Co., Ltd., London, 1920.

This is one of the best works to date on this subject. The chapters on first principles along with those on the construction and working of the various electrical modalities are clear and comprehensive in spite of the absence of complicated formulæ.

That portion of the work devoted to therapeutics is commendable for its detail as to technique.

The principles and use of the condenser discharge in muscle testing and treatment is of special interest.

The chapter on ultra-violet radiation, owing to the increasing importance of the subject is very opportune.

On the subject electro-therapy generally, one would, however, very much welcome something further in the way of authentic physiological research.

N. B.

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